grass valley

KayakDD™

DIGITAL PRODUCTION SWITCHER

User Manual

SOFTWARE VERSION 6.8.8

071826207
September 2006

the most watched worldwide

A THOMSON BRAND

Contacting Grass Valley

Region	Voice	Fax	Address	Web Site
North America	(800) 547-8949 Support: 530-478-4148	Sales: (530) 478-3347 Support: (530) 478-3181	Grass Valley P.O. Box 599000 Nevada City, CA 95959-7900 USA	www.thomsongrassvalley.com
Pacific Operations	+852-2585-6688 Support: +852-2585-6579	+852-2802-2996		
U.K., Asia, Middle East	+44 1753 218 777	+44 1753 218 757		
France	+33 1 45 29 73 00			
Germany, Europe	+49 6150 104 782	+49 6150 104 223		

Copyright © Thomson Broadcast and Media Solutions All rights reserved.

Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

Software Downloads — Software updates, drivers, and patches can be downloaded.

Contents

Page

1 Preface 15

1.1 About This Manual 15
1.2 Standard Documentation Set 15
1.3 Other Documentation 15

2 Concept 17

2.1 Introduction 17
2.1.1 KayakDD-1 18
2.1.2 KayakDD-2 19
2.2 KayakDD System Configuration Overview 20
2.3 Installation (Engineering Setups) 21
2.4 Configurations 21
2.5 Personality Settings 22
2.6 Signal Routing 23
2.6.1 Inputs and Sources 23
2.6.2 Source Definition 23
2.6.3 Button Assignment (Source to Button Mapping) 23
2.6.4 Key Memory 24
2.6.5 Buses and Crosspoints 24
2.6.6 Shifted Sources 25
2.7 The Mix/Effects (M/E) Stage 27
2.7.1 Alternate Buses and Delegation 28
2.7.2 Utility Bus 28
2.7.3 Effects Send 28
2.7.4 Outputs 29
2.7.5 Program and Preview Output Buses 29
2.7.6 Aux Buses 29
2.8 Resource Sharing and Point Of Use 30
2.9 Transitions 30
2.9.1 Cut 30
2.9.2 Mix 31
2.9.3 Full Additive Mix 31
2.9.4 Wipe 31
2.9.5 Other Wipe Pattern Generator Uses 32
2.9.6 Preset Black 32
2.9.7 Fade to Black 32
2.9.8 Transition Rate 32
2.9.9 Flip Flop Background Buses 32
2.9.10 Look Ahead Preview 33
2.9.11 Current and Next Stack 33
2.9.12 Key Priority and Transitions 33
2.10 Keying 34
2.10.1 Matte Fill Key Example 35
2.10.2 Shaping Video 36
2.10.3 Key Control Signal Adjustment 36
2.10.4 Clip and Gain 37
2.10.5 High Gain, Low Gain, and Unity Gain 37
2.10.6 Clip Hi and Clip Lo 38

2.10.7 S-Shaped Key Signals 39
2.10.8 Additional Keying Controls 39
2.10.9 Linear Key 41
2.10.10 Luminance Key and Self Key 42
2.10.11 Chroma Key 43
2.10.12 Primary and Secondary Color Suppression 44
2.10.13 Flare Suppression 44
2.10.14 Chroma Key Shadow Generator 44
2.10.15 Preset Pattern 45
2.10.16 Split Key 45
2.10.17 Properly and Improperly Shaped Video 46
2.11 3-D Digital Effects Concepts 50
2.11.1 Translation and Transformation 50
2.11.2 Axis Location 53
2.11.3 Source and Target Space 54
2.11.4 Post Transform Space 56
2.11.5 Front and Back, Near and Far 57
2.11.6 Transform Numbering Systems 57
2.11.7 Screen Coordinates 58
2.11.8 Spin and Rotation Relationship 60
2.11.9 Path Control 61
2.11.10 Tension Control 64
2.11.11 Continuity Control 66
2.11.12 Bias Control 68
2.11.13 Sure Touch 70

3 Control Panels 75

3.1 Overview KayakDD-1 Panel 75
3.2 Overview KayakDD-2 Panel 76
3.3 Background Bus Selection 77
3.3.1 Unshifted and Shifted Sources 77
3.4 Miscellaneous Bus Selection 78
3.4.1 Available Bus Delegations 78
3.5 Transition Control 80
3.5.1 Overview 80
3.5.2 Transition Types 82
3.5.3 Performing Transitions 83
3.5.4 Preset Black 83
3.5.5 Transition Preview 84
3.5.6 Transition Rates 84
3.5.7 Other Transition Control Interactions 84
3.6 Keyer Subpanel 85
3.6.1 Key 1...4 85
3.6.2 Key Types 86
3.6.3 Preset Pattern Key 88
3.6.4 Key Sources 88
3.6.5 Automatic Key Adjustment 90
3.6.6 FGD Fade 91
3.6.7 Key Prior Button 91
3.6.8 Key Over 91
3.6.9 Key Invert 91
3.6.10 Mask Delegation Buttons 92
3.6.11 Key PVW 92
3.6.12 Freeze Fill Button 92

3.6.13 Freeze Key Button 92
3.6.14 DPM Button 92
3.7 Positioner Subpanel 93
3.7.1 Positioner 94
3.7.2 Positioner Button 94
3.7.3 Positioner Delegation 95
3.7.4 Axis Lock Buttons 96
3.8 Effects Subpanel 97
3.8.1 DPM 98
3.8.2 Ram 102
3.8.3 MP (Media Player) 105
3.9 E-MEM 107
3.9.1 Definition of Terms 108
3.9.2 Display 109
3.9.3 Enabling and Disabling Bank Mode 110
3.9.4 Selecting a Register During Storing 110
3.9.5 Selecting a Register During Recalling 111
3.9.6 Storing a Snapshot 111
3.9.7 Deleting Snapshots and Timelines 111
3.9.8 Dissolve Functions Depending on Snapshot or Timeline Preselection 112
3.9.9 Other Button Functions 112
3.9.10 Timeline Editing 114
3.10 MaKe 121
3.10.1 Selecting a Register for Record Start 121
3.10.2 Recalling a Macro 122
3.11 Menu Subpanel 123
3.11.1 Home 123
3.11.2 Menu Lock 123
3.11.3 Live Mode 123
3.11.4 Last Menu 124
3.11.5 User1 – User4 124

4 Menus Overview 125

4.1 Introduction 125
4.1.1 Menu Panel Description 125
4.1.2 Touch Screen 126
4.1.3 Soft Knobs (Digipots) 126
4.1.4 Menu Screen Organization and Components 127
4.1.5 Data Pads and Touch Buttons 128
4.1.6 Menu Title 129
4.1.7 Menu Category Selection 129
4.1.8 Delegation Group 129
4.1.9 Mode Selection 129
4.1.10 Parameter Control Area 129
4.1.11 Additional Function Buttons 130
4.1.12 Menu Access Touch Button 130
4.1.13 Numeric Keypad 130
4.1.14 Alphanumeric Keypad 131
4.1.15 Menu and Panel Interactions 132

5 Menu Summaries 133

5.1 Home Menu 134
5.1.1 Home Menu Buttons 135
5.2 Install Menus 137
5.2.1 Install - Calibration Menu 137
5.2.2 Install – E-Box 139
5.2.3 System Setup Menu 155
5.2.4 Licenses Menu 164
5.2.5 Diagnosis Menu 166
5.3 Config Menus 167
5.3.1 Application Control 167
5.3.2 E-Box Configurations 170
5.3.3 Config – Panel Assignment 179
5.4 Personal Settings Menus 182
5.5 Wipes Menus 184
5.5.1 Point of Use 185
5.5.2 Pattern Selection Menu 187
5.5.3 Wipe Pattern Number Code 188
5.5.4 Wipe Modifier 190
5.6 Keyers Menus 192
5.6.1 Key Mode 193
5.6.2 Keyer Priority Misc Menu 194
5.6.3 Keyer Mask Menu 195
5.6.4 Keyer Mattes Menu 199
5.6.5 Chroma Key 200
5.6.6 Preset Pattern 201
5.7 Background Mattes Menus 202
5.8 M/E Menus 204
5.9 YUV Bus Correction Menus 206
5.10 RGB Input Correction Menus 207
5.11 DPM (Digital Picture Manipulators) Menus 209
5.11.1 General 209
5.11.2 Misc. Setup Menu 210
5.11.3 Drop Shadow 212
5.11.4 Transform Menus 215
5.11.5 Timeline Menus 219
5.11.6 Show Timeline Menu 224
5.11.7 SpecFX Kurl Menu 231
5.11.8 Misc Menu 241
5.11.9 Digital Effects Library 244
5.11.10 Catalog of Effects 247
5.12 RAM Recorder Menus 253
5.12.1 Stills Menu 254
5.12.2 Clip Select Menu 258
5.12.3 Clips Play Menu 259
5.12.4 Clips Record Menu 262
5.12.5 RAM Recorder Live Mode Menu 264
5.12.6 RAM Transfer Menu 266
5.13 E-Mem Menus 268
5.14 Media Player Menus 271
5.14.1 Clip Select Menu 272
5.14.2 Clips Play Menu 273
5.15 Other Menus 275

6 System Operation....277

6.1 Introduction....277
6.2 Matte Menu Controls....278
6.3 Keyer Priority....280
6.3.1 To Change the Current Keyer Priority....280
6.3.2 To Transition Between Different Keyer Priorities....281
6.4 Chroma Key Operating Notes....283
6.4.1 Auto Setup....283
6.4.2 To Chroma Key Using Auto Setup....284
6.4.3 To Chroma Key Using Auto Setup with FGD Fade....285
6.4.4 Manual Chroma Key Adjustments....285
6.4.5 Primary Suppression....286
6.4.6 Key Controls....288
6.4.7 FGD Fade....289
6.4.8 Secondary Color Suppression....290
6.4.9 Other Chroma Key Controls....292
6.5 Pattern Mix....293
6.5.1 To Create a Pattern Mix....293

7 Sidepanel Program....295

7.1 Introduction....295
7.1.1 Sidepanel Glossary....296
7.1.2 What's a Sidepanel Menu....296
7.1.3 Color Coding....297
7.1.4 Fixed Softkeys....298
7.1.5 Bar Graphics....300
7.1.6 Digipot Designator....301
7.1.7 Selection Box....301
7.1.8 List Boxes and Index Cards....302
7.1.9 Typewriter....303
7.1.10 Using a Mouse....304
7.1.11 Dialog Title....304
7.1.12 Menu Groups and Hierarchy....305
7.2 Startup Menu....307
7.2.1 Selection of the Mainframe....308
7.2.2 Selection of a Attached Panel....308
7.2.3 Close / Minimize / Shut Down....309
7.3 Status Menu....310
7.3.1 Selecting the M/E Main Menus....311
7.3.2 Enable / Disable the Faders....311
7.3.3 User Definable Presets....311
7.3.4 Attached Macros....312
7.4 M/E Menu....313
7.4.1 M/E Main Menu....313
7.4.2 Auto Times Menu....317
7.4.3 Color Background Menu....319
7.5 Remote Menu....322
7.5.1 Main Menu....322
7.5.2 GPI-Out Menu....324
7.5.3 Remote P-Bus....326
7.6 DVE Menus....329
7.6.1 DVE External....329
7.6.2 DPM Main....331

7.6.3 DPM Edit Menu 335
7.7 Media Player Menu 347
7.7.1 MP Status Menu 347
7.7.2 Media Player Clip Menu 349
7.7.3 RAM Recorder Transfer Menu 351
7.7.4 Image Converter Menu 355
7.8 Installation Menu 360
7.8.1 Install Main Menu 360
7.8.2 Install E-Box Menu 362
7.8.3 Install Panel Menu 379
7.9 System Menu 386
7.9.1 Dialog Buttons 386
7.9.2 Diagnosis Menu 389
7.10 Configuration Menu 391
7.10.1 Config Main Menu 391
7.10.2 Copy Config 395
7.10.3 Config Copy Simple Menu 396
7.10.4 Config Copy Detailed Menu 398
7.10.5 Config E-Box Menu 400
7.10.6 Config Panel Menu 423
7.10.7 Attached Macros Menu 437
7.11 Personality Menu 441
7.12 TiM/E Memo Menu 444
7.12.1 TiM/E Memo Select Menu 444
7.12.2 Define Memo Menu 448
7.12.3 Edit Menu 450
7.13 Aux Menu 457

8 Glossary 459

Table of Figures

Figure 1 KayakDD-1 Control Panel....18
Figure 2 KayakDD-2 Control Panel....19
Figure 3 Buses With Crosspoints....24
Figure 4 Multiple Crosspoint Control....25
Figure 5 Simplified Mix Effects (M/E) Subsystem....27
Figure 6 Effects Send Diagram....28
Figure 7 Normal and FAM Mixes....31
Figure 8 Matte Fill Luminance Keying Example....35
Figure 9 Key Clip, Gain, and Key Control Signal....37
Figure 10 Keying Gain Values....37
Figure 11 Key Hi, Clip Lo vs. Clip and Gain....38
Figure 12 S-Shaped Luminance Key Control Signal....39
Figure 13 Linear Keying....41
Figure 14 Luminance Keying (Self Key)....42
Figure 15 Chroma Key (Additive or Multiplicative)....43
Figure 16 Preset Pattern....45
Figure 17 Video and Key Signals From DPM....46
Figure 18 Correctly Shaped DPM Key Example....47
Figure 19 Incorrect Key With Dark Halo....47
Figure 20 Incorrect Keying With Shaped Input....48
Figure 21 Incorrect Key With White Halo....48
Figure 22 Incorrect Keying With Unshaped Key Fill....49
Figure 23 Picture Translation....50
Figure 24 Rotate....51
Figure 25 Aspect, Skew, Perspective....51
Figure 26 Frame of Reference Axis Locations....53
Figure 27 Source and Target Space....54
Figure 28 Source and Target Space Translation....54
Figure 29 Channel Translate With Global Rotated....55
Figure 30 Global Channel Translate With Global Rotated....55
Figure 31 Post Transform Translation....56
Figure 32 Screen Coordinates....58
Figure 33 Viewer Location in 3-D Space....58
Figure 34 Spin and Rotate Transform Nesting....60
Figure 35 Path Types....61
Figure 36 Path Vectors....63
Figure 37 Tension Control Setting Zero....64
Figure 38 Tension Control Setting 1.0....65
Figure 39 Tension Control Setting - 1.0....65
Figure 40 Continuity Control Setting Zero....66
Figure 41 Continuity Control Setting 1.0....66
Figure 42 Continuity Control Setting - 1.0....67
Figure 43 Bias Control Setting Zero....68
Figure 44 Bias Control Setting 1.0....69
Figure 45 Bias Control Setting - 1.0....69
Figure 46 Overview KayakDD-1 Control Panel....75
Figure 47 Overview KayakDD-2 Control Panel....76
Figure 48 Subpanel Background Bus Selection....77
Figure 49 Subpanel Transition Control....80

Figure 50 Subpanel Keyers 85
Figure 51 Key Type Buttons 86
Figure 52 Subpanel Positioner 93
Figure 53 Positioner 94
Figure 54 Subpanel Effects 97
Figure 55 Components of Timeline 114
Figure 56 Components of Timeline 123
Figure 57 Touch Screen Display 125
Figure 58 Soft Knobs (Digipots) 126
Figure 59 Example Screen Organization and Components 127
Figure 60 Numeric Key Pad 130
Figure 61 Alphanumeric Key Pad 131
Figure 62 Home Menu 134
Figure 63 Home Menu - Recall Preset 136
Figure 64 Install - Calibration Menu 137
Figure 65 Install – E-Box Setup Dialog 139
Figure 66 Install - Genlock Menu 140
Figure 67 Install - Genlock Menu With Asynchronous Buses 141
Figure 68 Install - Editor Menu 143
Figure 69 Install - Editor Menu 144
Figure 70 Install - GPI Menu 145
Figure 71 Install - GPO Menu 146
Figure 72 Install - Misc Menu 147
Figure 73 Install – Machine Control Menu 148
Figure 74 VDCP Protocol Options 149
Figure 75 ODETICS Protocol Options 150
Figure 76 BVW-75 Protocol Options 151
Figure 77 ODETICS Protocol Options 152
Figure 78 Install – VTR Emulation 153
Figure 79 Install – Select VTR Emulation 154
Figure 80 Install – Select VTR Emulation Devices 154
Figure 81 System Setup Dialog 155
Figure 82 Device Control Menu 156
Figure 83 Device Control Menu With Software Update Dialog 157
Figure 84 Start Installation Procedure 158
Figure 85 Installation Procedure 158
Figure 86 Cancel Installation Procedure 159
Figure 87 Finish Installation 159
Figure 88 CPLD Update 161
Figure 89 Configure Devices 162
Figure 90 Reset/Clear/Check Devices Menu 163
Figure 91 Install Licenses Menu 164
Figure 92 Install Diagnosis Menu 166
Figure 93 Config – Application Control 167
Figure 94 Config – Application Control – Edit Devices 168
Figure 95 Config – Application Control – Change Devices 169
Figure 96 Config – E-Box Configuration 170
Figure 97 Config - GPI Menu 171
Figure 98 Config - GPI Functions 172
Figure 99 Config - GPO Menu 173
Figure 100 Config - GPO / Tally Mode Selection 173
Figure 101 Config - Key Couple Menu 174
Figure 102 Config – Coupled Key Selection Menu 174
Figure 103 Config - Aux Menu 175

Figure 104 Config – M/E Menu 176
Figure 105 Config – Cleanfeed Layer 176
Figure 106 Config – DPM Menu 177
Figure 107 Config – DPM Menu 178
Figure 108 Config – Panel Assignment Menu 179
Figure 109 Config – Panel Assignment - Bus Row Selection Menu 180
Figure 110 Config – Panel Assignment – Reset 181
Figure 111 Personal Settings Menu 182
Figure 112 Personal Settings – XBar Tally Mode 183
Figure 113 Personal Settings – Macro Attachment Play Mode 183
Figure 114 Wipe Menu – Pattern Selection 184
Figure 115 Typical Wipe Switching Matrix and Point of Use 186
Figure 116 Pattern Selection Menu 187
Figure 117 Wipe Menu – Modifier 1 190
Figure 118 Wipe Menu – Modifier 3 191
Figure 119 Wipe Menu – Modifier 3 191
Figure 120 Keyer Menu 192
Figure 121 Keyer Menu – Mode Selection 193
Figure 122 Keyer Menu - Priority 194
Figure 123 Keyer Menu – Mask 195
Figure 124 Keyer Menu – Mask Source 196
Figure 125 Keyer Menu – Box Mask 196
Figure 126 Keyer Menu - Wipe Mask 197
Figure 127 Keyer Menu – Utility Bus Mask 198
Figure 128 Keyers Mattes Menu 199
Figure 129 Keyers Mode Chroma Key Menu 200
Figure 130 Keyer Mode – Preset Pattern 201
Figure 131 Background Matte Menu 202
Figure 132 Background Mattes Menu - Wash 203
Figure 133 M/E Menu – Wipe Trans 204
Figure 134 M/E Menu – Border Matte 205
Figure 135 YUV Bus Correction Menu 206
Figure 136 RGB Input Correction Menu 207
Figure 137 DPM – Misc - Setup Menu 210
Figure 138 Key Selection for DPM Channels 211
Figure 139 DPM – Misc – Drop Shadow 1 212
Figure 140 DPM – Misc – Drop Shadow 2 213
Figure 141 DPM – Misc – Shadow Crop 214
Figure 142 DPM – Key 1 -Transform Menu 215
Figure 143 DPM – Edit Gang Selection 216
Figure 144 DPM – Path Type Selection 216
Figure 145 DPM – Spin Selection 217
Figure 146 DPM – Adjust Tension, Continuity, and Bias 217
Figure 147 DPM – Key 1 – Transform - Crop 218
Figure 148 DPM – Timeline – Save/Recall Menu 219
Figure 149 DPM – Timeline – Save/Discard 220
Figure 150 DPM – Timeline – Modify 221
Figure 151 DPM – Timeline – Video Sources 222
Figure 152 DPM – Timeline – Video Sources 223
Figure 153 DPM – Timeline – Edit Menu 224
Figure 154 DPM – Timeline – Delegation Selection 225
Figure 155 DPM – Timeline – Direct Mode Buttons 227
Figure 156 DPM – Timeline – Popup Buttons 227
Figure 157 DPM – Timeline – Modify Keyframe 228

Figure 158 DPM – Timeline – Insert Buttons 228
Figure 159 DPM – Timeline – Delete Buttons 229
Figure 160 DPM – Timeline – Duration / Start Time Buttons 229
Figure 161 DPM – SpecFx – Kurl Menu (Off) 231
Figure 162 DPM – SpecFx – Kurl Mode Selection 232
Figure 163 DPM – SpecFx – Kurl Menu (Page Turn Mode) 233
Figure 164 DPM – SpecFx – Kurl Menu (Pos/Size Mode) 235
Figure 165 DPM – SpecFx – Kurl Menu (Horiz. Mode Selection) 236
Figure 166 DPM – SpecFx – Kurl Menu (Pattern Selection) 237
Figure 167 Available Wave Patterns 237
Figure 168 DPM – SpecFx – Kurl Menu (Pos/Size Mode) 238
Figure 169 DPM – SpecFx – Kurl Menu (Slits Mode) 239
Figure 170 DPM – SpecFx – Kurl Menu (Slits Mode) 240
Figure 171 DPM – Kurl Mode – Misc Selection 241
Figure 172 DPM – Misc Setup 241
Figure 173 DPM – Set to Default 242
Figure 174 DPM – Default Selection 242
Figure 175 DPM – Timeline – Modify 243
Figure 176 Config - DPM – Timeline – Modify 244
Figure 177 Home Menu 253
Figure 178 RAM Recorder - Stills 254
Figure 179 Delegation Buttons 254
Figure 180 RAM Recorder – Readout Buttons 255
Figure 181 RAM Recorder – Vid/Key Mode Buttons 256
Figure 182 RAM Recorder – Stills 257
Figure 183 RAM Recorder – Clip Select 258
Figure 184 RAM Recorder – Clips Play 259
Figure 185 Modify Buttons 260
Figure 186 RAM Recorder – Clips Record 262
Figure 187 RAM Recorder – Live Mode Stills Recall 264
Figure 188 RAM Recorder – Clips/Stills Transfer 266
Figure 189 RAM Recorder – Transfer Stills to USB 267
Figure 190 RAM Recorder – Transfer Stills to RAM 267
Figure 191 E-Mem – Define Memo PP 268
Figure 192 E-Mem – Define Memo ME1 269
Figure 193 E-Mem – Define Memo Misc Intern 269
Figure 194 E-Mem – Define Memo Misc Extern 270
Figure 195 Media Player – Clip Select 272
Figure 196 Media Player – Clips Play 273
Figure 197 Media Player – Delegation 274
Figure 198 Matte Menu, Wash Control Selected 278
Figure 199 Matte Menu, Base Color Selected 279
Figure 200 Keyer Priority Menu, Current Stack Selected 280
Figure 201 Keyer Priority Menu, Next Stack Selected 282
Figure 202 Keyer Menu, Chroma Keyer 284
Figure 203 Keyer Chroma Menu, Pri Suppress, Part1, Luma / Chroma / Flare S. 286
Figure 204 Key Controls, Part1, Clip HI, Clip Low, Opacity 288
Figure 205 Sec Suppress Controls Part1, Luma / Chroma / Angle 290
Figure 206 Other Controls Part1, Shadow Clip / Shadow Gain / Shadow Opacity 292
Figure 207 Pattern Mix Menu 293
Figure 208 Sidepanel Menu Structure 297
Figure 209 Sidepanel – List Box 302
Figure 210 Sidepanel – Typewriter 303
Figure 211 Sidepanel – Start Menu 307

Figure 212 Sidepanel – Status Menu....310
Figure 213 Sidepanel – M/E Main Menu....313
Figure 214 Sidepanel – Auto Times Menu M/E....317
Figure 215 Sidepanel – Auto Times Menu P/P....318
Figure 216 Sidepanel – Color Background Menu....319
Figure 217 Sidepanel – Remote Menu....322
Figure 218 Sidepanel – GPI Menu....324
Figure 219 Sidepanel – Remote P-Bus Menu....326
Figure 220 Sidepanel – External DVE Menu....329
Figure 221 Sidepanel – DPM Main Menu....331
Figure 222 Sidepanel – Cursor Modes....335
Figure 223 Sidepanel – Cursor Mode Standard....336
Figure 224 Sidepanel – Cursor Mode Wrap....336
Figure 225 Sidepanel – Cursor Mode C Speed....337
Figure 226 Sidepanel – Cursor Mode V Speed....337
Figure 227 Sidepanel – DPM Edit – Setup Menu....340
Figure 228 Sidepanel – DPM Edit – Kurl PS Modulation Menu....341
Figure 229 Sidepanel – DPM Edit – Timeline Menu....342
Figure 230 Sidepanel – DPM Edit – Save / Recall Menu....344
Figure 231 Sidepanel – DPM Edit – Misc Menu....346
Figure 232 Sidepanel – Media Player Status Menu....347
Figure 233 Sidepanel – Media Player Clip Menu....349
Figure 234 RAM Recorder - Transfer....351
Figure 235 RAM Recorder - Transfer....352
Figure 236 RAM Recorder - Transfer....353
Figure 237 RAM Recorder - Transfer....354
Figure 238 RAM Recorder – Image Converter....355
Figure 239 RAM Recorder – Image Converter – Select Target Format....356
Figure 240 RAM Recorder – Image Converter – Source Pixel Format....357
Figure 241 Sidepanel – Install Main Menu....360
Figure 242 Sidepanel – Install E-Box Menu....362
Figure 243 Sidepanel – Index Card Copy....364
Figure 244 Sidepanel – Index Card GPI....365
Figure 245 Sidepanel – Index Card GPO....366
Figure 246 Sidepanel – Index Card DVE....367
Figure 247 Sidepanel – Index Card Router....368
Figure 248 Sidepanel – Index Card External DSK....369
Figure 249 Sidepanel – Index Card Aux Busses....370
Figure 250 Sidepanel – Index Card Tally....371
Figure 251 Sidepanel – Index Card Tally Assignment....372
Figure 252 Sidepanel – Index Card Aux CP....373
Figure 253 Sidepanel – Index Card Ext Aux....374
Figure 254 Sidepanel – Index Card UMD....375
Figure 255 Sidepanel – Index Card Machine....376
Figure 256 Sidepanel – Index Card Editor....377
Figure 257 Sidepanel – Index Card P-Bus....378
Figure 258 Sidepanel – Install Panel Menu....379
Figure 259 Sidepanel – Index Card Aux CP....380
Figure 260 Sidepanel – Index Card Aux Global....381
Figure 261 Sidepanel – Index Card UPK....382
Figure 262 Sidepanel – Index Card UMD....384
Figure 263 Sidepanel – Index Card Sat Panel....385
Figure 264 Sidepanel – System Menu....386
Figure 265 Sidepanel – Index Card Drives....387

Figure 266 Sidepanel – Index Card Devices 388
Figure 267 Sidepanel – Diagnosis Menu 389
Figure 268 Sidepanel – Config Main Menu 391
Figure 269 Sidepanel – Config Copy Simple Menu 396
Figure 270 Sidepanel – Copy Config Detailed Menu 398
Figure 271 Sidepanel – Config E-Box Menu 400
Figure 272 Sidepanel – Index Card Audio 401
Figure 273 Sidepanel – Index Card Audio Assign 402
Figure 274 Sidepanel – Index Card Global 404
Figure 275 Sidepanel – Index Card Input 406
Figure 276 Sidepanel – Index Card GPI 407
Figure 277 Sidepanel – Index Card GPO 409
Figure 278 Sidepanel – Index Card Aux CP 410
Figure 279 Sidepanel – Index Card Aux CP Assign 412
Figure 280 Sidepanel – Index Card ME Settings, 1st Page 414
Figure 281 Sidepanel – Index Card ME Settings, 2nd Page 414
Figure 282 Sidepanel – Index Card Editor 416
Figure 283 Sidepanel – Index Card Aux Names 417
Figure 284 Sidepanel – Index Card Aux Couple 418
Figure 285 Sidepanel – Index Card Subst Table 419
Figure 286 Sidepanel – Index Card ME Settings 420
Figure 287 Sidepanel – Index Card Title 421
Figure 288 Sidepanel – Index Card Tally In 422
Figure 289 Sidepanel – Config Panel Menu 423
Figure 290 Sidepanel – Index Card MaKE 424
Figure 291 Sidepanel – Index Card Config Panel 426
Figure 292 Sidepanel – Index Card Aux CP 429
Figure 293 Sidepanel – Index Card MaKE 431
Figure 294 Sidepanel – Attached Macros Menu 437
Figure 295 Sidepanel – Attachment Display 440
Figure 296 Sidepanel – Personality Menu 441
Figure 297 Sidepanel – Index Card Panel, 1st Page 442
Figure 298 Sidepanel – Index Card Panel, 2nd Page 442
Figure 299 Sidepanel – Index Card SidePanel 443
Figure 300 Sidepanel – Master TiM/E Memo Menu 444
Figure 301 Sidepanel – Define Memo Menu 448
Figure 302 Sidepanel – Master TiM/E Memo Edit Menu 450
Figure 303 Sidepanel – Aux Menu 457

1 Preface

1.1 About This Manual

This KayakDD User Manual Instructions is designed as reference manual for operators of KayakDD-1 and KayakDD-2 Production Switcher systems.

1.2 Standard Documentation Set

The standard KayakDD documentation set consists of a:

- User Manual,
- Planning and Installation, and
- Release Notes.

The *User Manual* contains background information about the KayakDD-1/2 Digital Production Switcher and describes operating procedures. This manual can be used while learning about KayakDD and for enhancing your basic knowledge of the system.

The *Planning and Installation Manual* contains information about installing, configuring, and maintaining the system.

The *Release Notes* contain information about new features and system enhancements for a specific software version, and also includes software installation procedures. Always check the release notes for your current system software before you begin operating your system.

1.3 Other Documentation

Communication protocols of KayakDD are available upon request for developers and software engineers to use to design editor and other external interfaces to the KayakDD system.

2 Concept

2.1 Introduction

In general, any video switcher receives multiple video inputs, performs signal processing on selected input signals, and then outputs the processed video. Efficient real time switcher operation is essential for live production, and can save valuable time in post production environments as well.
Several innovative concepts are employed in the KayakDD-1 and KayakDD-2 Digital Production Switcher to enhance its operational speed and flexibility. Understanding these concepts, as well as basic switcher fundamentals, will help you take full advantage of the exceptional power of the KayakDD system.

2.1.1 KayakDD-1

Figure 1 KayakDD-1 Control Panel

One M/E production switcher with the following features:

- Switch able between 525-line and 625-line formats
- Fully digital 10-bit, 4:2:2 inputs, outputs, and video processing
- Compact, lightweight 2 RU video processing frame
- Low power consumption
- Intuitive menu with touch screen
- 16 inputs
- 5 fixed M/E outputs (2x PGM, 1x Preview, 1xClean, 1xCleanPVW)
- 10 timed auxiliary buses
- Internal frame optional RAMRecorder holds short clips and stills and works as frame synchronizer
- Remote monitoring support via optional NetCentral software
- Four keyers, each with linear, luminance and optional Chromatte™ chroma key functionality
- Optional RGB color correction
- Four channels of high-end digital effects (Option)

2.1.2 KayakDD-2

Figure 2 KayakDD-2 Control Panel

Two M/E production switcher with the following features:

- Switch able between 525-line and 625-line formats
- Fully digital 10-bit, 4:2:2 inputs, outputs, and video processing
- Compact, lightweight 3 RU video processor frame
- Low power consumption
- Intuitive menu with touch screen
- 32 inputs
- 10 fixed M/E outputs (2x PGM, 1x Preview, 1xClean, 1xCleanPVW per M/E)
- 10 timed auxiliary buses
- Internal frame optional RAMRecorder holds short clips and stills and works as frame synchronizer
- Remote monitoring support via optional NetCentral software
- Four keyers, each with linear, luminance and optional Chromatte™ chroma key functionality per M/E
- Optional RGB color correction
- Four channels of high-end digital effects (Option) per M/E

2.2 KayakDD System Configuration Overview

The KayakDD Digital Production Switcher is designed for operational flexibility, and can be configured to fit various applications. Different KayakDD systems can have different capabilities, or the same KayakDD system can be re-configured to have different capabilities at different times.
The way a KayakDD Digital Production Switcher is wired into your facility affects the KayakDD system's capabilities. For example, the number of sources physically connected to the system obviously determines what video the system can handle. However, because KayakDD system video/key inputs and Aux Bus outputs can be configured, once video cables are physically connected they need not be moved. Configuration settings also control many other capabilities that affect KayakDD system behavior.

KayakDD Digital Production Switcher configuration information is divided into three areas:

- **Installation** (Engineering Setups) (settings established by the engineer in charge that affect the entire system, which never need to be changed by operators),
- **Configuration** (settings for e.g. a production that affect all the operators working in that suite, that are designed to suit a particular show or production style and ensure a consistent working environment), and
- **Personality Setting** (settings that give the operator the ability to customize his individual work surface to meet his personal preferences).

All KayakDD settings are non-volatile. Disk save and load operations are available via the **Sidepanel Program** that allows users to store configuration information on the hard disk of a PC or on a movable media for easy transport and for use as backup copies.

2.3 Installation (Engineering Setups)

Engineering Setups control how the KayakDD Digital Production Switcher's major components behave and interact, and how the KayakDD system interacts with the rest of the facility.
Engineering Setups are not likely to change on a daily basis and so are grouped separately from Configurations and Personality Settings. Facility maintenance personnel or the engineer in charge of a production truck generally manages Engineering Setups. These parameters are usually set during installation.

Engineering Setups information includes:

- Networking (IP addresses),
- Timing, Type of Reference signal
- External device interfaces (DDRs, VTRs, DPM, Router, Aux Control Panels, etc.),
- Various other system functions.

2.4 Configurations

A configuration defines how the control surfaces associated with a KayakDD suite behave. A configuration can substantially change system behavior, not just a user's view of the system. Configurations are intended for day-to-day or session-to-session changes in KayakDD system operating behavior and so are open for modification by operators.
Loading and Storing Configurations is possible via the Sidepanel Program

Suite Preferences include:

- E-MEM,
- Macros,
- Key Memory,
- Pattern Memory,
- Safe title behavior, etc.,
- Video specifications (aspect ratio, etc.),
- Various other suite functions.

2.5 Personality Settings

Personality Settings allow users to customize a KayakDD control surface to suit their personal operational style. User Preferences do not change KayakDD system capabilities. Loading and Storing Personal Settings is possible via the Sidepanel Program

Personality Settings include:

- Menu delegation behavior,
- Shift preferences, and
- Various other user functions.

General Rule:

- All setup changes, which will **not** work **without an physical change** of a device are part of **Installation** (menu).
- All setup changes, which will work **without an physical change** of a device are part of **Configuration** (menu).

E.g. setting up the type, the address, and the connection port for an auxiliary control panel is part of Installation, configuring the behavior and the button assignment of this Aux CP is part of a configuration.

2.6 Signal Routing

2.6.1 Inputs and Sources

Incoming video signals are connected to the KayakDD system via BNC connectors on the rear of the KayakDD Digital Processor frame. All inputs are serial digital (SMPTE 259M, CCIR 601). Signals from external devices not operating in this standard will need to be converted.
Some devices (for example, a camera providing serial digital output) may provide a video signal that can be received on a single connector. However, other devices may output multiple signals.
For example, a character generator usually provides a signal with two components (commonly called *video* and *key*). Some incoming signals may also originate from devices the KayakDD system can control (Router, DPM, DDR).

For a KayakDD Digital Production Switcher, the term *source* refers to all the video signals and other attributes associated with a device. This is a fundamental concept. The KayakDD system is based on sources, not input signals or crosspoints. Each source can be given a descriptive name, but has an ID Number for absolute identification. The KayakDD system uses ID numbers, not source names or input connectors, to identify each source. Defining each source is an important aspect of the KayakDD system.

2.6.2 Source Definition

The source definition process includes assigning a name to each source. Once sources are defined, the user is able to select the source by name. Sources having separate video and key signal are coupled in the key couple menu to allow a single button selection for appropriate keying. Tally relays are assigned to the according inputs in the GPO menu.

All these settings are part of a configuration and can change from production to production.

2.6.3 Button Assignment (Source to Button Mapping)

Source to button mapping makes it possible to organize sources on KayakDD control panels in a preferred order. For example, cameras can be placed on the left side or the right side of the button row, whichever is preferred.
Source mapping is distinct from source definition, as source mapping only involves the location of sources on the control panel and does not affect any capabilities defined for the sources. Note that E-MEM effects store the source IDs, not the source select buttons, so remapping sources will not change the appearance of recalled effects. Button assignment is possible via the Sidepanel program.

2.6.4 Key Memory

Key parameters can be saved to a separate key memory for every KayakDD system source. These parameters can be applied automatically whenever that source is selected.

2.6.5 Buses and Crosspoints

A *bus* is technically defined as a signal path where one of several available inputs can be selected to feed a single output. A *crosspoint* is an electronic switch that allows a signal to pass when the switch is closed. On video switchers, a bus can be constructed containing a series of crosspoints, which permits selecting which one of several incoming signals will be sent out the bus. In *Figure 3*, source 2 has been selected on the background A bus. This signal can now be called *background* video and is available for further processing.

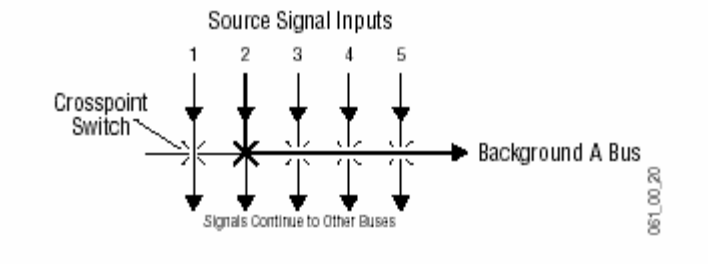


Figure 3 Buses With Crosspoints

Buttons on a control panel can be used to control the switching of crosspoints. The buttons are usually arranged horizontally, making it easy to imagine the available signals coming in from the top, and the single bus output signal going out the right side. In earlier generation switchers, the terms *crosspoint button* and *crosspoint bus* have been used in reference to control panel source selection.
For a KayakDD system, the terms *source button* and *source bus* will be used.
These terms better reflect a system operating philosophy that is source rather than crosspoint based.
The KayakDD system does not directly associate a source select button with a physical crosspoint. The association goes first through source to button mapping, then through source definition to find the physical inputs.
On the KayakDD system, a single source button can control crosspoints on different buses simultaneously. For example, during keying, both the video and key signals of a source can be selected with a single button press.
In this case two different crosspoints on separate buses (key fill bus and key cut bus) are actually switched when the button is pressed.

In the upper part of Figure below, the *video* component of source 2 in the figure has been selected on the key fill bus and becomes the *key fill* signal for subsequent keying. The key component of source 2 selected on the key cut bus becomes the *key cut* signal for keying. The lower part of *Figure 4* below shows how the same source (source 4) can be selected for both the key fill and key cut signals.

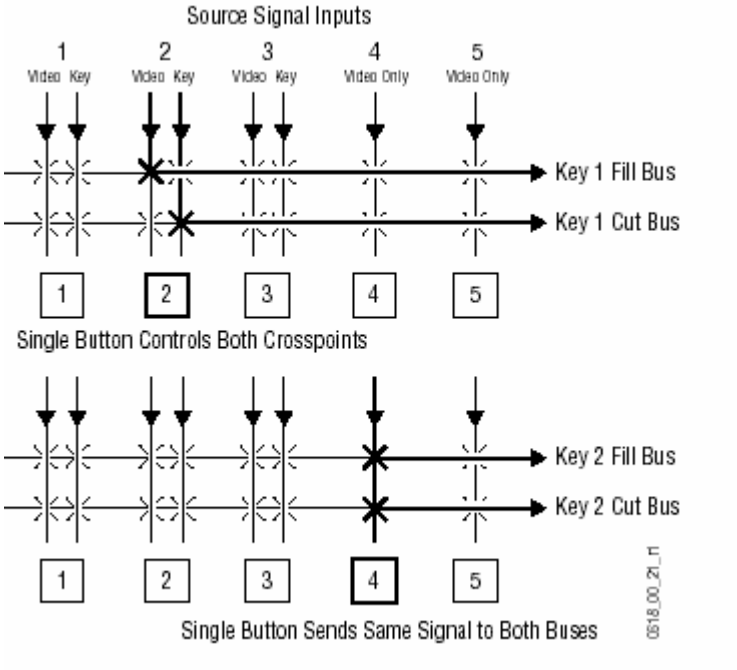


Figure 4 Multiple Crosspoint Control

2.6.6 Shifted Sources

An operator may need to quickly access many sources during a production. However, a control panel has size limitations, since all the source selection buttons must remain within reach. The KayakDD system provides shifted buttons to allow access to more input sources from the control panel.

For example, on the KayakDD-1 system, up to 28 sources can be mapped at one time, 14 to the unshifted source selection, and 14 to the shifted buttons. A dedicated **Shift** button is provided as the farthest right crosspoint button (Crosspoint 15) for every bus. Two shift modes are available: Normal and Latched.

In Normal mode, shifted or unshifted status of the bus is indicated by the state of the **Shift** button light. Holding down the **Shift** button while pressing a source button always selects the shifted source for that bus.

The **Shift** button will light when the row of buttons to its left are shifted.

In Latched mode, the **Shift** button toggles on and off in a manner similar to the Caps Lock button on a standard keyboard. When on, it lights to indicate that the subsequent selection(s) on the crosspoint selector row will be made from the shifted set of sources (15 through 28). When off, the subsequent selection(s) come from the unshifted set (1 through 14). If the user toggles the **Shift** button to the state that is opposite from the shift state for the currently selected input, then the crosspoint selector button blinks to indicate this "out of sync" condition.

A useful configuration is to have sources normally used for backgrounds (e.g. VTRs) mapped to unshifted buttons, and sources normally used as keys (e.g. character generators) mapped to shifted buttons. Then you can then set all the background buses to an unshifted preference, and all the key buses to a shifted preference. All normal source selections can then be made without having to use the shift modifier buttons.
It is also possible to have a different assignment for background and key buses.

2.7 The Mix/Effects (M/E) Stage

Each M/E of the KayakDD system can create a composite of two or more pictures. It includes multiple source selection buses and provides transition (mix and wipe) and keying capabilities on the selected signals.
The M/E can be organized with the keying circuitry separate from the mixing circuitry, which permits Effect Send capabilities (see 2.7.3 below for more information).
A simple basic M/E used in a typical switcher will be used as an example in the following discussion. The KayakDD M/E has added capabilities, but the basic principles described here will apply.

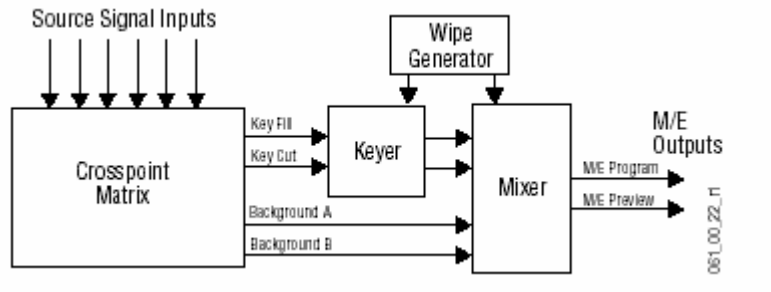


Figure 5 Simplified Mix Effects (M/E) Subsystem

The basic M/E shown in *Figure 5* 11 has an A and a B background bus. These buses select the background video signals sent to the output of the M/E.
Generally the source on the background A bus is the current background output, and the source on the background B bus is the background video that will be used next. During most transitions, portions of both backgrounds are output simultaneously. The keyers in the M/E allow the inclusion of additional material over the background. Wipe generators also exist, which create patterns used by the mixer for wipe transitions, or used by the keyers to modify the signals it sends the mixer.

The processed signal in an M/E is then sent to an M/E output, typically program or preview (or can be selected as input in the second M/E).

2.7.1 Alternate Buses and Delegation

Many earlier generation switchers had M/Es equipped with two keyers, and each M/E could accept two background sources. This permitted mixing or wiping between two backgrounds, and keying up to two additional sources over the background. Dedicated rows of control panel buttons were used to select these key and background signals.

The KayakDD system M/E actually has four keyers, each handling a fill and a key signal, and it can accept three background sources (A, B, and Utility). Providing individual source selection rows for each bus is impractical, as the panel would become too large. For ease of use, KayakDD panels have alternate buses accessed by delegation, using Key and PVW/AUX delegation via the **Miscellaneous Bus selection** subpanels.

2.7.2 Utility Bus

Besides the standard A and B background inputs, each KayakDD also accepts a Utility input. The Utility bus can be used to select signals for special purposes, and has no relation to the background buses. For example, a video signal selected on the Utility bus can be used to feed a custom pattern into a wipe generator, or create a custom border wash pattern.

2.7.3 Effects Send

Effects Send provides a method of integrating digital effects devices into the M/E. Effects Send switches the key cut and key fill outputs of the keyer of the M/E to a digital effects device for manipulation. The manipulated key cut and key fill outputs are then received and sent directly to the inputs of the mixer circuits of the M/E. Effects Send allows you to process a key effect as though the digital effects circuits were located inside the M/E itself.

On the KayakDD system, Effects Send is integrated into the M/E and is an extension of the keying control system.

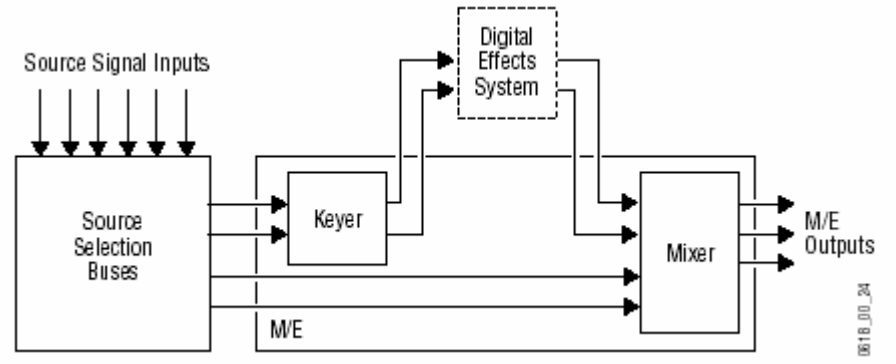


Figure 6 Effects Send Diagram

If the KayakDD system is equipped with the optional Digital Picture Manipulator option, the effects become part of the internal M/E's mixer.

2.7.4 Outputs

Video production switchers generate several different video outputs (Program, Preview, etc.). A final program output from PGM is typically sent to the transmitter for broadcast and/or to output devices for recording.
Aux Bus outputs may also be used for special purposes.

2.7.5 Program and Preview Output Buses

For each M/E, the KayakDD system has dedicated BNC output connectors for the following signals:

- 2x Program
- 1x Preview
- 1x Clean
- 1x Clean Preview

In addition

- 1x Aux 1 … Aux 10

2.7.6 Aux Buses

Video production switcher Aux Buses can be used to select and route sources to specific destinations. For example, a source selected on an Aux bus can be sent to an recorder for instant replay. This can be done directly by the Technical Director while he/she switches the program.
Remote Aux panels can be used to give different operators control over one or more Aux buses.
The KayakDD system has 1 dedicated BNC output connector per aux bus.

2.8 Resource Sharing and Point Of Use

The KayakDD system can share some resources for use at different locations. The location where a resource is being used is called a point of use.

The wipe pattern generator resources can be used for an M/E wipe transition, as a preset pattern, as a mask, or at other points of use. It is also possible to assign the output of the same wipe pattern generator to different points of use at the same time.
For efficient operation, the KayakDD system has divided the parameters controlling wipe pattern generators and related utility bus functions into two categories; shared generator parameters and point of use parameters.
The set of parameters for the shared generator are used by all points of use, so changing one of these parameters will affect all locations where that wipe pattern generator is being used at that time. Separate sets of point of use parameters, however, are maintained for each KayakDD system point of use.
These settings are used only by each individual points of use, so changing them will not affect any other point of use.
For example, a wipe shape (box, circle, etc.) is a generator parameter, but the softness of the shape's edges is a point of use parameter. If the same wipe generator is used by both an M/E wipe transition and a preset pattern, adjusting softness at one point of use will not affect the other's softness settings. However, changing the pattern shape affects both locations.

2.9 Transitions

A transition is a change from one image to another. The KayakDD system supports three basic types of transitions:

- Cut
- Mix
- Wipe
- DPM (optional)

A transition can be applied to the entire picture, or to only the background or keyed elements of the picture, and can include multiple elements.

2.9.1 Cut

A *cut* is an instantaneous switch from one image to another (between successive video fields or frames). The simplest type is a *hot cut*, accomplished by selecting a different source on a bus feeding an M/E output. This only changes that bus's contribution to the output, and does not change what elements may be involved in the output (the same buses are involved).
The KayakDD system also provides cut transitions, where the elements involved in a composite can be changed instantaneously. Different buses can be included or excluded, causing changes in the resulting composite image. Background cut transitions on The M/E are first selected on the Background B bus to allow previewing the upcoming picture before it is cut "On Air".

2.9.2 Mix

A *mix* is a transition from one picture to another where the new picture fades in as the existing picture fades out. During a standard mix transition a superimposition of both pictures, each at a lower intensity, is visible.
The KayakDD system allows mixing from one background to another and to mix up to four separate keys on or off over a background. Background and key mixes can be done separately or simultaneously.

2.9.3 Full Additive Mix

Full Additive Mix (FAM) is a special mix transition that the KayakDD system supports besides normal crossfade transitions. Picture elements in FAM transitions are composited differently through the time of the transition.

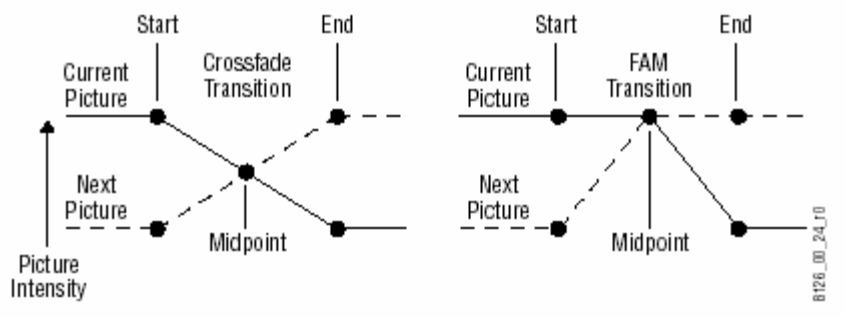


Figure 7 Normal and FAM Mixes

FAM transitions first fade a new picture to full intensity and then fade the old picture out, but both full intensity pictures are mixed together to the output during the transition. The resulting signal is clipped at white level to prevent generating illegal video.

2.9.4 Wipe

A *wipe* is a transition from one picture to another in which the edge of a shape moves across the screen, revealing the new picture. Wipe transitions can be applied to backgrounds, to keys, or to both simultaneously. A wipe transition shape can be selected from a variety of patterns, and these patterns can be adjusted in several ways (position, aspect ratios, edge attributes, etc.).
Each KayakDD M/E has two separate transition wipe systems, each of which can be assigned a different wipe pattern and be adjusted independently. These systems can each use one of the two available complex wipe pattern generators with advanced capabilities. It is also possible to combine these wipes to create extremely complicated wipe transition shapes, and generally this is used only by advanced operators. Utility bus video signals can also be used to generate a custom pattern for a wipe transition or other purposes.

2.9.5 Other Wipe Pattern Generator Uses

Wipe pattern generator circuitry can be used for purposes that do not involve transitions. Each KayakDD M/E has the two complex wipe pattern generators described above, and each of its four Keyers also has a simple pattern generator and a box pattern generator, making a total of six wipe generators. These pattern generators can also be used for Preset Pattern, Masking, and Matte Washes.

2.9.6 Preset Black

Preset Black is a special type of transition, where the picture transitions to black, and then transitions out of black to the new picture. Preset Black is really two transitions, one to and one from black, and so requires two operator commands to complete. Preset Black can be used with any transition type (cut, mix, or wipe). The entire picture goes to black, even if all the transition elements involved in the picture were not selected.

2.9.7 Fade to Black

The Fade to Black control in the DSK allows the Program output of the switcher to be brought down to black at a predetermined transition rate.

2.9.8 Transition Rate

Cut transitions are instantaneous, but mix and wipe transitions have durations.
Transition durations can be set in advance to a specific transition rate, and be initiated by pressing a button the control panel. It is also possible to manually control transitions using a lever arm.

On the KayakDD system, one transition rate can be assigned to the main transition of the M/E. This type of transition can be controlled by that M/E's lever arm. Each of the four keyers on the M/E can also be assigned its own transition rate, initiated with a separate Key Mix button.

2.9.9 Flip Flop Background Buses

At the completion of a transition, the background buses swap their source selections (flip flop). This makes the upper bus always act as the on-air bus, and the lower bus act as a preset bus. The operator can reliably setup the next source on the lower bus without disturbing the source selected on the on-air upper bus.
For example, if a transition begins with source 1 on Background A and goes to source 2 on Background B, as soon at the transition to source 2 completes, source 2 will be taken to the Background A bus (without disturbing the output of the M/E). The source 1 selection will also be immediately taken to the Background B bus.

2.9.10 Look Ahead Preview

If a preview monitor is configured for Look Ahead Preview mode, the end result of the upcoming transition can be viewed on that monitor. This lets the operator know in advance what will occur for that next transition.

2.9.11 Current and Next Stack

KayakDD uses a current and next stack approach for transitions that involve multiple elements. The current stack is the current M/E output including any keys that are on. The next stack is defined by the current stack and whatever next transition elements have been selected. Look ahead preview always displays the next stack. Next transition elements affecting stacks are Keys 1 - 4, background, and key priority.
KayakDD transitions always occur from the current stack to the next stack.
For example, if the current stack has Key 1 over Background A, and the next stack specifies Key 2 over Background B, a mix transition will occur between the composites (Key 1 over A to Key 2 over B). This is different from mixing Key 1 off, Key 2 on, and mixing between A and B at the same time, which would cause the keys to go transparent over their background during the transition.

On the KayakDD system, opacity is retained throughout the transition, so midway through this example Key 1 remains fully keyed over Background A, and Key 2 is fully keyed over Background B. The transition occurs between these two fully keyed composites.

If multiple keys are faded in or out using the separate Mix button each keyer has it’s opacity changed with relation to all other keys. This means that keyer transitioned this way or no longer considered part of the composite and will show transparency.

2.9.12 Key Priority and Transitions

The four keyers on a KayakDD M/E can be assigned priorities. This determines the layering of the keys. The highest priority key appears on top, while keyers with lower priority may be partially or fully hidden behind those with higher key priorities. The backgrounds always have the lowest priority. Changes in key priority can be included as a part of a transition.
Like any other transition, the current stack will transition to the key priority of the next stack. For example, suppose the current stack has Keys 1, 2, and 3 in that key priority order over Background A, and the next stack specifies key priority order 3, 2, 1. A mix transition will occur between the 1, 2, 3 composite order to the 3, 2, 1 composite order. All three keys will remain fully keyed over the background, and will mix to their new key priority order.

2.10 Keying

Keying inserts part of one picture into another to create a composite picture. Keying involves three signals:

- Background,
- Key cut, used to specify where to cut a hole in the background, and
- Key fill, used to fill the hole in the background.

The fill can be an incoming video signal or it can be an internally generated matte fill. A separate key cut input signal is not necessarily required for keying. For example, a self key (also called a video key) uses the same input signal for both key cut and key fill.

The KayakDD system supports the following types of keys:

- Additive Key
- Luminance Key
- Linear Key
- Chroma Key
- Preset Pattern

The KayakDD system also supports self keys and split keys.

2.10.1 Matte Fill Key Example

One of the earliest keying techniques was to use an art card and camera to perform a luminance key with a matte fill. This type of key is a good example for explaining basic keying principles because three separate and independent incoming signals are used.

To insert a green logo into background video, the logo can be printed in white on black paper and a camera can be focused on it. The signal from the camera can be selected as the key cut signal and green matte video can be selected as the key fill signal sent to the keyer. The key cut signal is then adjusted (clipped) to ignore the black paper and use only the white logo shape to cut a hole in the background video. The keyer then shapes the key fill to precisely match the logo-shaped hole cut in the background and fills it with green matte video. This creates a green logo inserted into the background (*Figure 8*). Because luminance values of the key cut signal are used to cut the hole in the background this is called a luminance key.

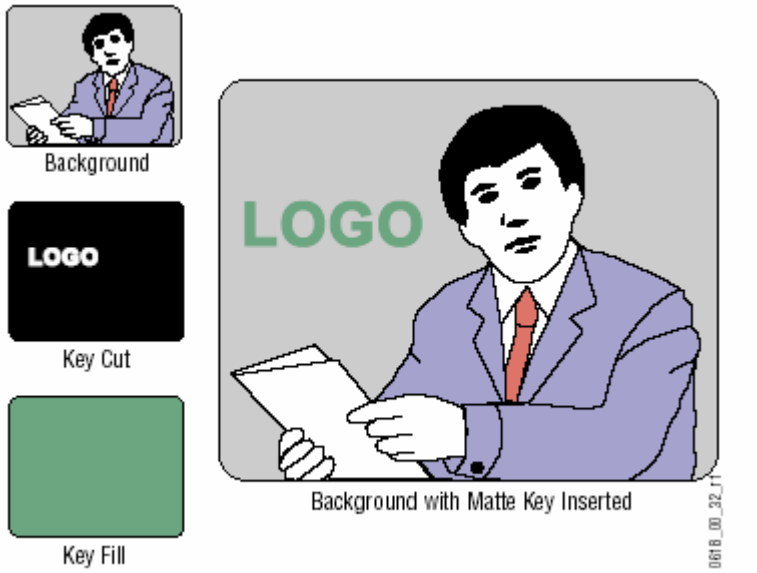


Figure 8 Matte Fill Luminance Keying Example

In this keying discussion illustrations rather than actual screen images are used for simplicity, and because the printing process has difficulty capturing the subtleties of soft key edges.

2.10.2 Shaping Video

In the matte key example above, the key fill signal was a full raster color that did not match the shape of the key cut signal. This key fill signal is accurately called *non-shaped* video, but may also be referred to as *unshaped* video since both signal types are processed identically during keying.
Some external devices (e.g., character generators) provide a key cut signal and an already processed companion key fill signal. A key fill signal that correctly matches the key cut signal is called *shaped* video. During keying, properly shaped key fill video can be summed with a background signal (with a hole cut) and achieve the desired result.
The appropriate key mode for this type of signal is the additive key.

If a key fill does not match the hole in the background (like in the matte key example above), the key fill needs to be shaped by the switcher. By multiplying the key fill signal with the key control signal the unwanted areas of the fill can be made black, shaping the video to match the hole before it is summed with the background. Key fill video must be shaped using the key cut signal actually used to create the hole in the background. Video shaped with a different key cut signal will not key correctly.
The appropriate key mode for this type of signal is the Linear key or Luminance Key.

See section 2.10.17 *Properly and Improperly Shaped Video* for more information.

Note that an unshaped signal viewed directly will show harsh edge artifacts due to dividing by a small number. This is normal and expected.
Keying this signal will clean up its appearance.

2.10.3 Key Control Signal Adjustment

During keying, the selected key cut signal can be converted into a key control signal. It is the key control signal that actually cuts the hole in the background video. Adjusting the key control signal (Clip and Gain) is essential in the keying process. The art of setting up a good key is to use just enough Gain to suppress any imperfections in the incoming key signals.
Setting Gain too high can cause ragged key edges.
The KayakDD system provides two methods for adjusting the key control signal, Clip and Gain, and Clip Hi and Clip Lo. Note that the same basic keying process is controlled by either of these methods.

2.10.4 Clip and Gain

The Clip and Gain operation selects a threshold of the selected key cut video that will be used to cut the hole in the background video. Clip controls the threshold, and Gain controls the softness of the key edges and any translucent areas. High portions of the key cut signal specifies what video is retained, and low portions determine what video is removed. Intermediate levels specify a soft blend of the background and fill video.

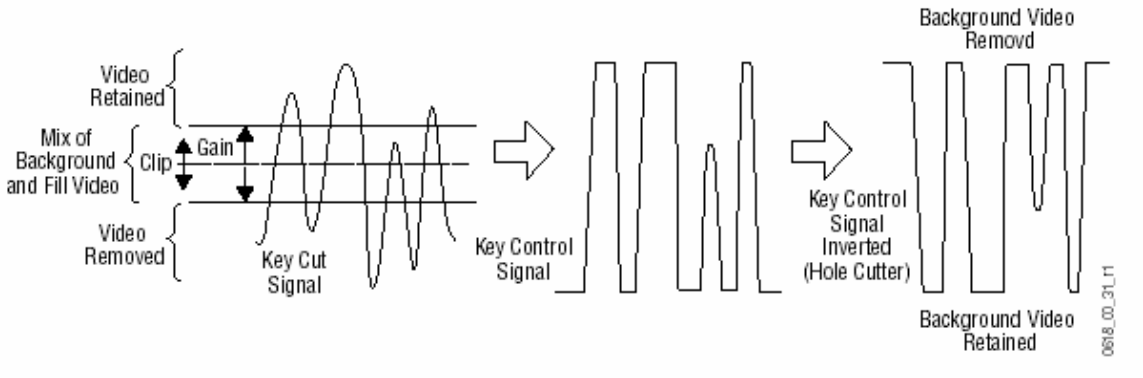


Figure 9 Key Clip, Gain, and Key Control Signal

Clip and Gain control is appropriate for high gain keys (see below), to easily adjust where the relatively hard transition from background to fill occurs. In this mode, changing the Clip control moves the threshold up and down without affecting Gain, which is adjusted separately with its own Gain control.

2.10.5 High Gain, Low Gain, and Unity Gain

A high gain key has a narrow range, creating harder key edges. A low gain key has a wider range, creating softer key edges. Linear keys typically use minimal gain (also called unity gain) to completely preserve the soft edges of the keys (*Figure 10*). Note that the KayakDD system also supports keys that go below unity gain.

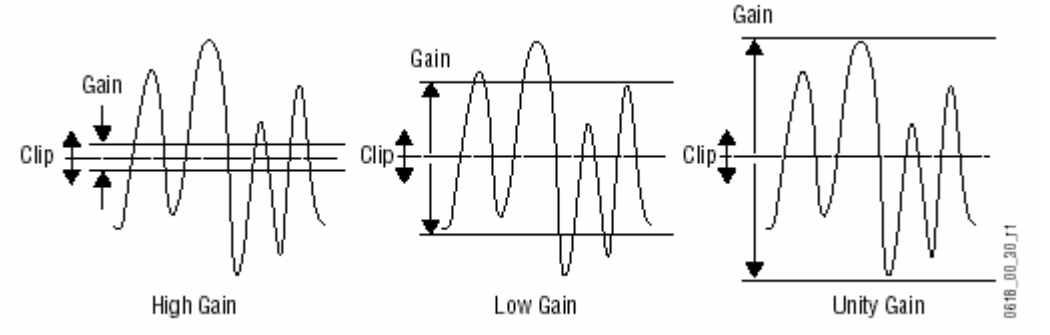


Figure 10 Keying Gain Values

On the KayakDD system, Gain has a percentage value. A Gain value of 50% requires a luminance change of 50% of the distance between black and white to produce a keying signal ranging from transparent to opaque. A gain value of 100% (unity gain) uses the entire range between black and white for this transparent to opaque transition. A gain value of 0% produces the hard key edges (a high gain key).

2.10.6 Clip Hi and Clip Lo

The KayakDD system also supports a Clip Hi and Clip Lo mechanism. With Clip Hi and Clip Lo, two thresholds are established. The upper threshold specifies at what point video will be completely removed from the background, and the lower threshold determines at what point background video will be retained completely intact.

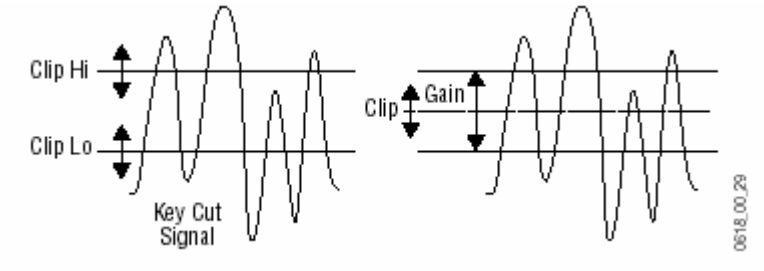


Figure 11 Key Hi, Clip Lo vs. Clip and Gain

In this mode, Gain changes when either control is adjusted. The difference between the upper and lower keying thresholds is equivalent to gain:

- Clip Hi = Clip + Gain/2
- Clip Lo = Clip – Gain/2

Clip Hi and Lo control is more appropriate for low gain keys, to allow independent control of the two thresholds. For example, when adjusting a linear key the operator wants to control where the fill becomes opaque (Clip Hi) and where the fill becomes transparent (Clip Low). In Clip Hi/Lo mode adjusting the point of opacity does not change the point of transparency, and vice versa.
Clip, Gain, Clip Hi and Clip Low adjustments always interact. Changing one always results in changes to two other values. Changing Clip Hi or Clip Low changes both Clip and Gain, not just Gain.

2.10.7 S-Shaped Key Signals

On the KayakDD system, an S-shaping function is applied to the edges of luminance keys. S-shaping smoothes the sharp corners of a luminance key control signal, which helps prevent banding artifacts. S-shaping a signal minimally affects the key edges, and does not move key thresholds or affect
the overall gain of the key.

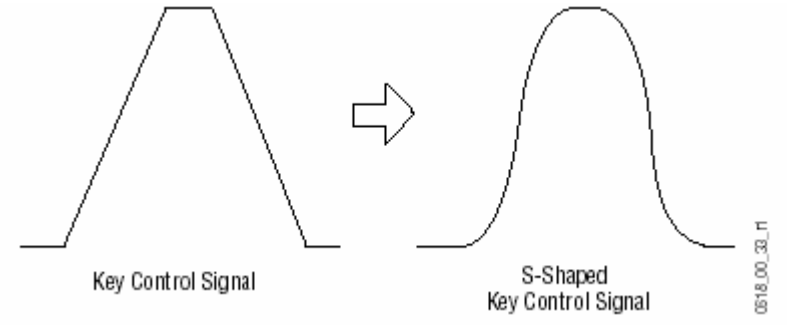


Figure 12 S-Shaped Luminance Key Control Signal

S-shaping is generally not applied to linear keys because the external device usually applies an S-shaping function when it generates the key cut and key fill signals. S-shaping should not be applied twice.

2.10.8 Additional Keying Controls

The following additional controls are available for keying.

2.10.8.1 Key Invert

Keys can be inverted, causing holes to be cut in the background where a normal key retains the background, and vice versa. Key invert makes the white areas of the key cut signal produce transparency, and the black areas produce opacity, the opposite of a standard key.

2.10.8.2 Masking

Masking defines areas that are protected from keying (Inhibit Mask) or always key (Force Mask). The shape of the mask can originate from a wipe pattern generator or by a selected mask signal (typically a key fill signal delivered via the Utility bus).
With the KayakDD Still Store, the mask signal can be a frozen page of video or a key fill. Complex mask shapes are often easier to draw by hand than to create with multiple wipe patterns.

2.10.8.3 Opacity

The opacity of a key can be adjusted. When opacity is reduced below 100% some background video is allowed to show through areas where it is normally excluded. Key opacity is an adjustment to the overall intensity of the key, and is separate from Clip and Gain controls. Note that a common mistake is to set opacity to zero and forget that adjustment was made, which can cause confusion later when that key is selected but not visible.

2.10.8.4 Key Positioning

Key positioning allows slight adjustment of the horizontal position of the key cut signal relative to the key fill signal. This is useful if the timing of the two signals at the switcher inputs are not matched properly. This is generally only a problem if the cut or fill follow analog paths from source to switcher or if the source has video/key timing adjustments which have been set to compensate for other delays within the facility.

2.10.8.5 Key Size

Key size allows the key cut signal to be narrowed slightly. This can greatly enhance self keys and chromakeys that have been reshaped.

2.10.8.6 Coring

Coring helps reduce video noise in chromakeys. Coring is used when a key fill signal has noise in areas that are supposed to be transparent. When noise exists in these areas it can appear in the background portion of the keyed composite. Coring replaces the noisy black areas outside the shaped fill with clean black before it is summed, eliminating the noise.

2.10.8.7 Show Key

Although the key control signal is not directly visible in the final video output, this signal can be previewed as a black and white image using the Show Key function. White areas of a show key indicate areas of complete opacity, black indicate complete transparency, and gray areas indicate translucent areas of the key. The whiter the show key signal, the more opaque the key will be. This key preview signal reflects all the adjustments that have been made to the key control signal.

2.10.9 Linear Key

A linear key typically uses separate key cut and key fill input signals that are intended to be used for linear keying. The key cut and key fill are usually anti-aliased (soft edged) shaped signals created by a character generator or graphics system. There may also be translucent areas intended to allow some background to show through the key (watermarks). The level of the key cut signal determines where and how deeply the hole will be cut into the background. The intended soft edge and translucency of the key can then be faithfully reproduced.

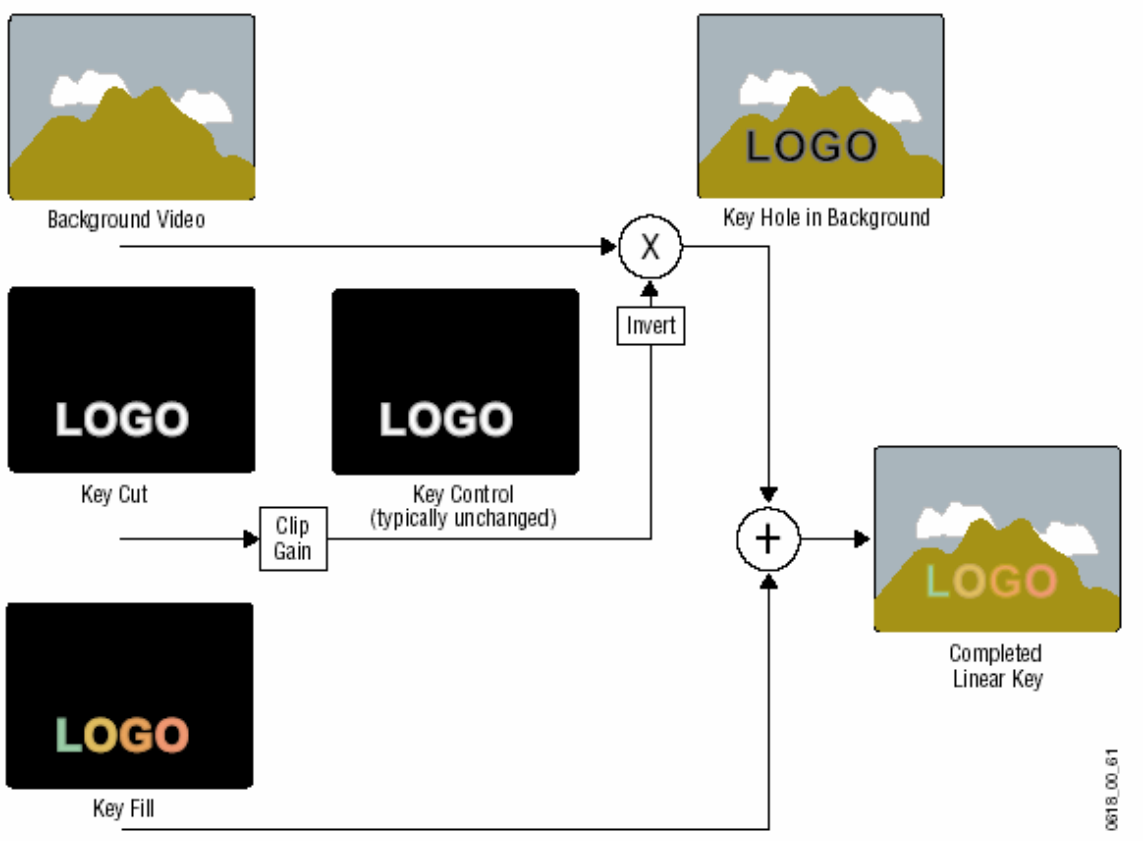


Figure 13 Linear Keying

NOTE!
The soft edges in the illustrations in this part of the manual are simulated. The key edges are actually gradients, which allows these edges to blend smoothly with the background. In the KayakDD System the Linear Key is just a special parameter setup of the Luminance Key

2.10.10 Luminance Key and Self Key

A luminance key uses the luminance of an incoming source to specify where to cut the hole in the background. The earlier example of a matte fill key is a type of luminance key. Luminance keying is typically done on sources that do not have an accompanying key cut signal, like a video camera. The key cut signal must be generated from the incoming video signal, using clip and gain controls. When only one source is used for both key cut and key fill, the key is called a Self key or Video key. The same key source signal is multiplied by the key cut signal to create the key fill, and then the signals are summed.

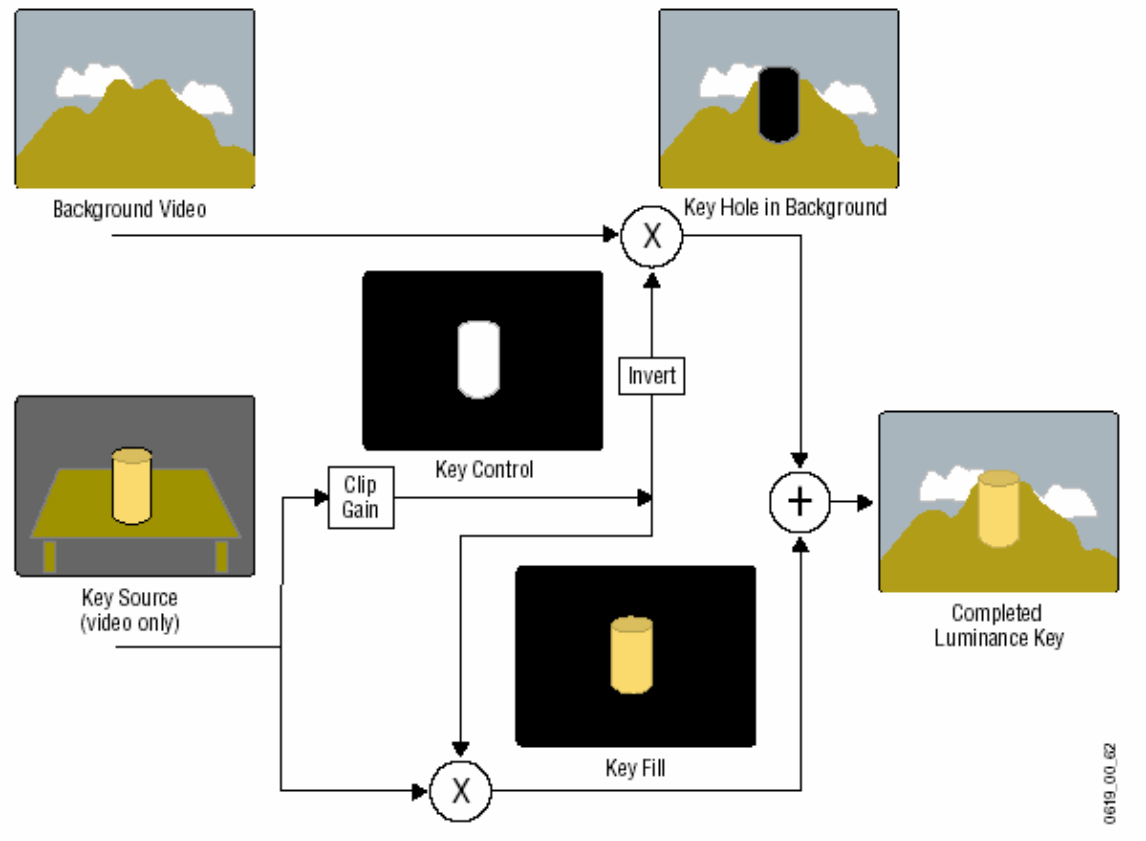


Figure 14 Luminance Keying (Self Key)

Clip and Gain (or Clip Hi/Lo) controls for luminance keys offer wide adjustment ranges. On the KayakDD system, an S-shaping function is also applied to the edges of luminance keys.

2.10.11 Chroma Key

A chroma key is a key that detects color (rather than luminance) in a video image and replaces it with a new background. For example, a reporter may be in a studio sitting in front of a backdrop with a blue or green backing color, and the new background can be a mountain scene. The completed chroma key consists the mountain scene replacing the backing color, creating the illusion that the reporter is sitting in front of the mountain.

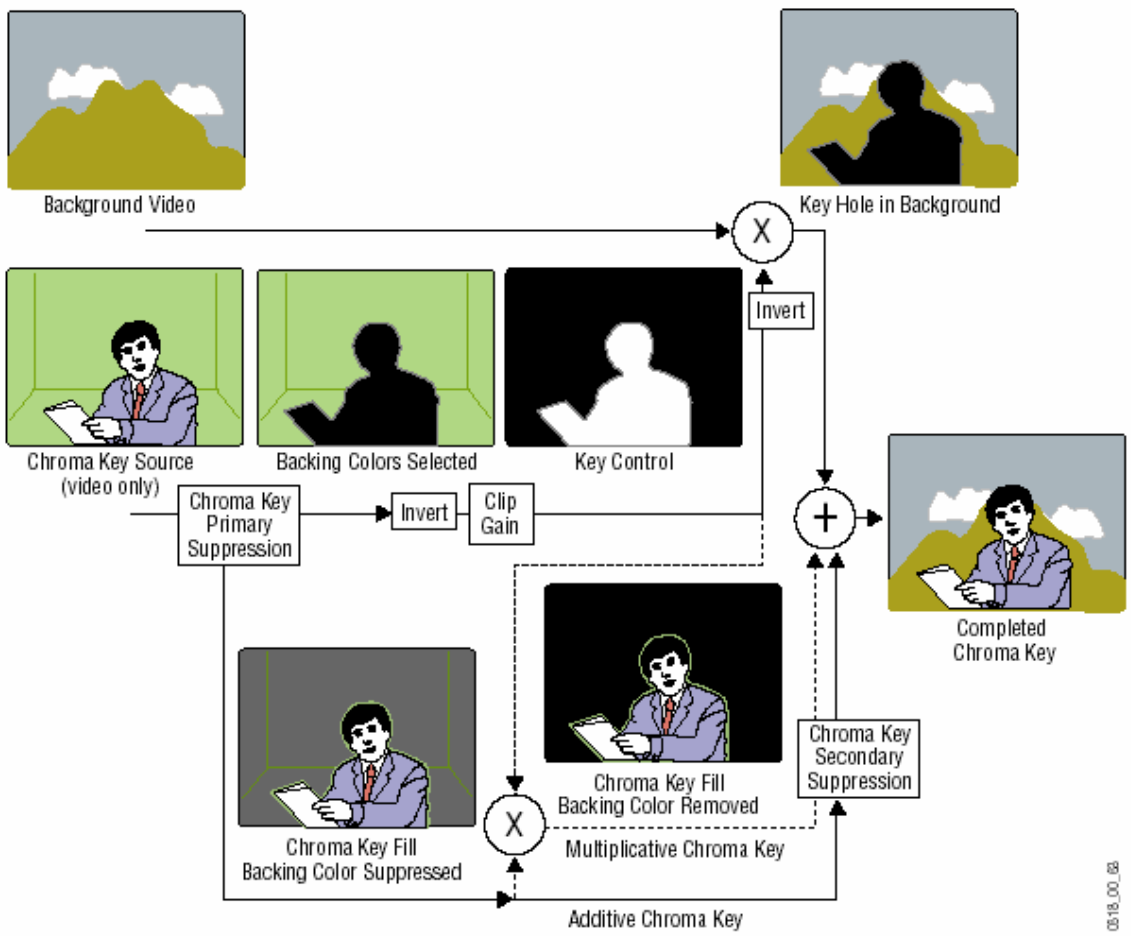


Figure 15 Chroma Key (Additive or Multiplicative)

The terms foreground and background are often a source of confusion when used for chroma keys. Foreground refers to the people or objects in a chroma key scene that are in front of the colored backdrop. Background refers to the scene that will replace the backing color (same as a linear or luminance key) in the final picture. Background does *not* refer to the backdrop of the foreground scene.

Chroma keys are performed by suppressing the backing color in the foreground scene, cutting a hole in the background, and then combining the two processed signals. When conditions are ideal, complete suppression of the backing color is possible and the hole cut in the background will match the suppressed foreground, permitting these two signals to be added successfully.
This is called an additive chroma key (used when the KayakDD system Foreground Reshaping feature is off). When conditions do not permit adequate backing color suppression, the foreground with its backing color suppressed can be multiplied by the keying signal to prevent contaminating areas of the background outside the keyed area. This is called a multiplicative chroma key (used when the KayakDD system Foreground Reshaping feature is on). Setting up a successful chroma key setup involves many more adjustments than other keys. No amount of adjustment, however, can overcome problems caused by an improperly set up studio chroma key scene.

2.10.12 Primary and Secondary Color Suppression

As described above, chroma key primary color suppression replaces the old backing color with black before replacing it with the new background video. It usually has a very low selectivity and therefore suppresses a wide range of colors. The goal is to suppress as much of the backing color as possible without affecting foreground regions.
Secondary suppression is essentially a second chroma keyer that can be used to deal with areas where the backing color passes through some translucent portion of the foreground object, like smoke or liquid. This also includes hair since fine detail often mixes with the backing color. The goal of secondary suppression is to restore the natural color of the foreground object. In general, medium to high selectivity values will be used.
Primary and secondary suppression adjustments are used to select the hue to be replaced and for adjusting the luminance and chrominance levels in the areas of the picture where suppression is applied.

2.10.13 Flare Suppression

Flare suppression can be used to compensate for backing color reflected onto foreground objects, or for lens flare (backing color reflections within the camera lens). In these cases, the foreground object will take on a slight greenish or bluish tint. Flare suppression subtracts a slight amount of the primary suppression color from the foreground.

2.10.14 Chroma Key Shadow Generator

The KayakDD system has a shadow generator that can be used to include shadows that fall on the backing area of the scene in the background.
Shadow offset, range, and density controls are also available that offer control over the placement and appearance of the added shadow.

2.10.15 Preset Pattern

A preset pattern uses a wipe pattern generator, rather than an incoming key cut signal to define the hole cut in the background. Key clip and gain controls are not available for a preset pattern, but controls over the location, size, border, opacity, and edge softness are available.

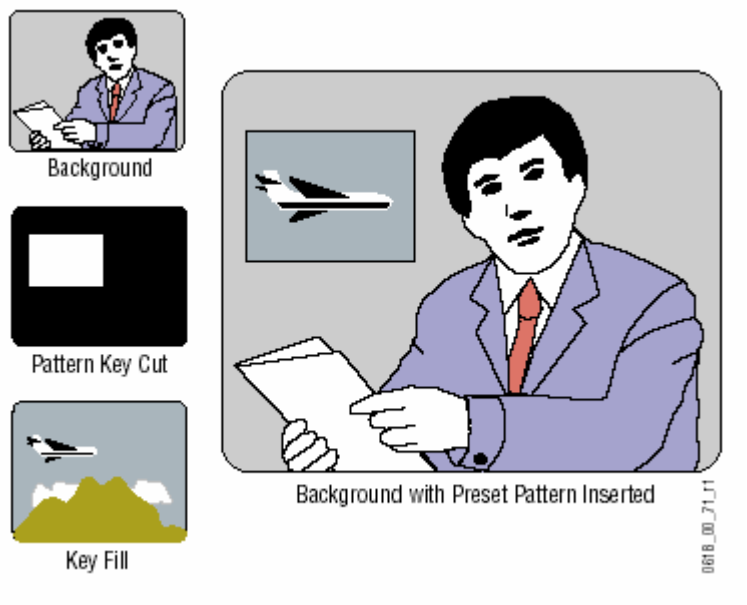


Figure 16 Preset Pattern

2.10.16 Split Key

A split key uses an alternative key cut signal for keying. On the KayakDD system, a key split is performed by holding down the **Key Split** button and selecting the desired key cut signal.

Split keys should normally treat the fill as unshaped since by definition a split key uses a fill that is not related to the cut, . that means the normal mode for keying is Luminance or Linear Key Mode.

2.10.17 Properly and Improperly Shaped Video

The following illustrations show the results of using correctly and incorrectly shaped video. In these examples, the video fill comes from a DPM that provides both a key signal and a fill video signal (a linear key). The DPM's key signal, fill video that has been set as a shaped output, and fill video set as unshaped is shown in Figure 24.

Figure 17 Video and Key Signals From DPM

When the shaping is done properly (using either shaped (Additive Key) or unshaped (Luminance Key) key fill) the desired output is the result (*Figure 18*).

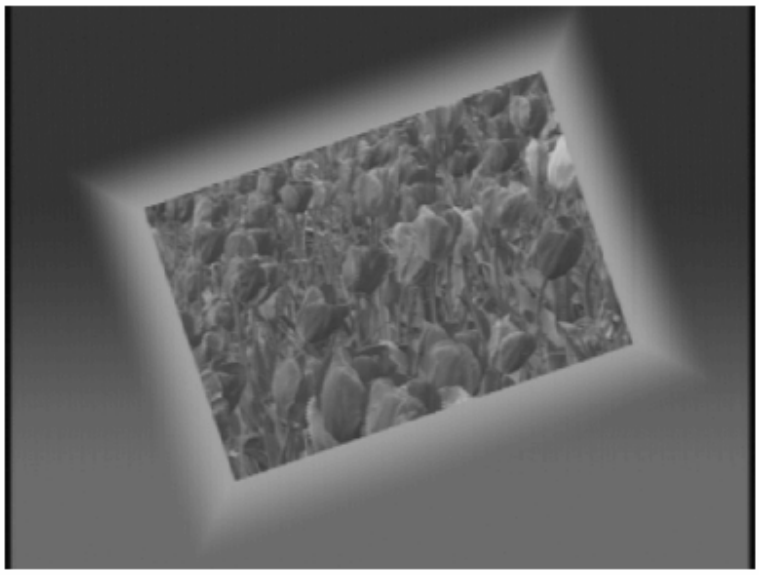


Figure 18 Correctly Shaped DPM Key Example

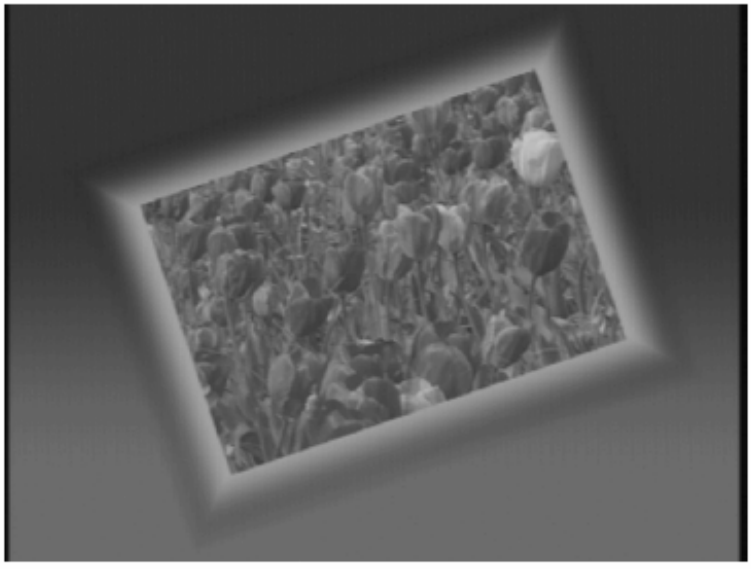


Figure 19 Incorrect Key With Dark Halo

In this case the shaped input is incorrectly shaped again, sometimes called a double-multiply. Luminance Key was used for shaped key fill signal.

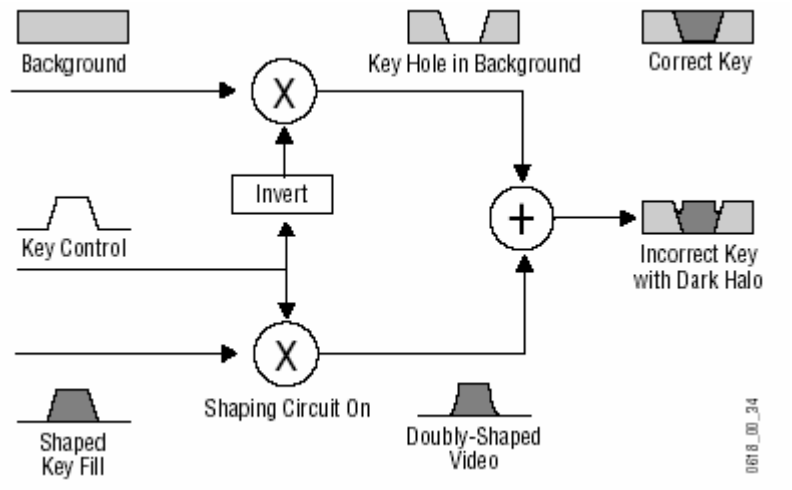


Figure 20 Incorrect Keying With Shaped Input

When the DPM provides an unshaped video output but the key is processed as though it were shaped, excessive luminance occurs where the key fill video and key hole edges overlap, producing a white halo around the key. Additive Key was used for unshaped key fill signal.

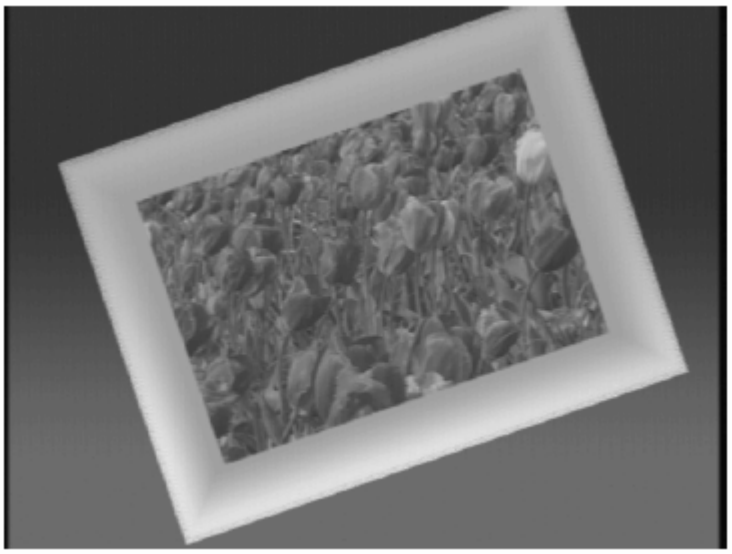


Figure 21 Incorrect Key With White Halo

In this case the unshaped video fails to be shaped at all.

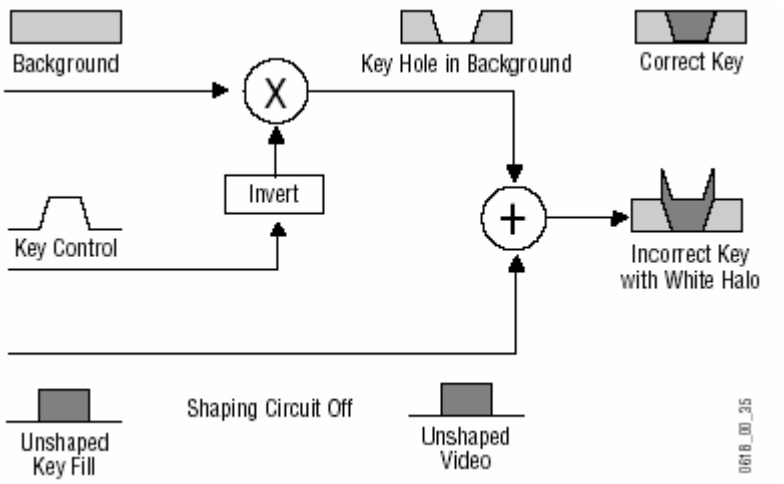


Figure 22 Incorrect Keying With Unshaped Key Fill

Recognizing the appearance of improperly shaped video helps you know how to correct the problem should it occur.

2.11 3-D Digital Effects Concepts

The KayakDD Digital Picture Manipulator options provide 3-D planar image translation and transformation from within each M/E of the KayakDD system. Image translation has special basic concepts and terminology you should understand in order to get the most out of using the option.

2.11.1 Translation and Transformation

Translation is a subset of transformation, and involves picture movement along the X, Y, and Z axis. The picture is simply relocated to a different place and does not change in actual size or shape.

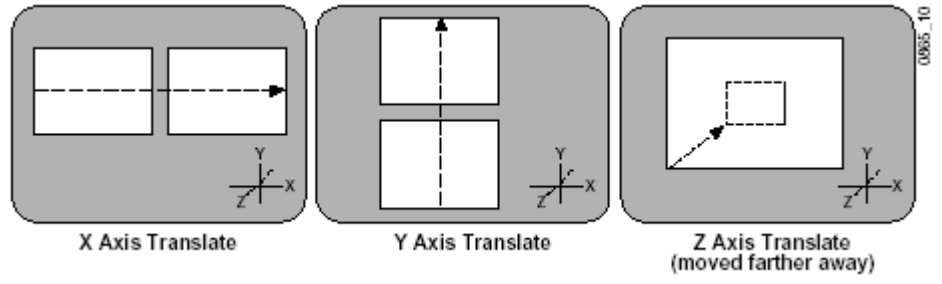


Figure 23 Picture Translation

Transformation includes translation, and also includes these other functions:

2.11.1.1 Size

Enlargement and reduction of the picture area while it remains in the same plane in 3-D space. This is different from picture translation in the Z axis, where the picture retains its original size, but appears smaller when moved away, and larger when moved closer.

2.11.1.2 Rotate

Picture rotation about the reference axis in the X, Y, and Z dimensions (*Figure 24*). Rotate is limited to ± one half revolution, and will always take the shortest path to the new position. Rotate uses Quaternion math to calculate the move with increased accuracy. Multiple rotations are performed with the Spin function.

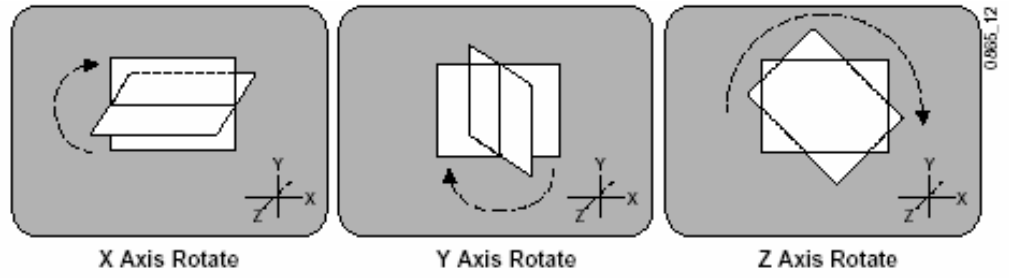


Figure 24 Rotate

2.11.1.3 Spin

Supports multiple rotations about the reference axis in the X, Y, and Z directions. Spin supports fractional values, and is similar to Rotate when the move is less than ±. one half revolution. Spin uses Euler math to calculate the move, which is not quite as precise as Quaternion, but permits multiple rotations. Spin applies transform values in Z, X, Y order, so editing effects in this axis order provides the best control of the effect.

NOTE! *Following broadcast conventions, moving the Joystick forward or back along the Joystick's Y axis rotates the top of the picture forward or back (a rotation about the X reference axis). Similarly, moving the Joystick left or right along the Joystick's X axis rotates the side picture left or right (a rotation about the Y reference axis).*

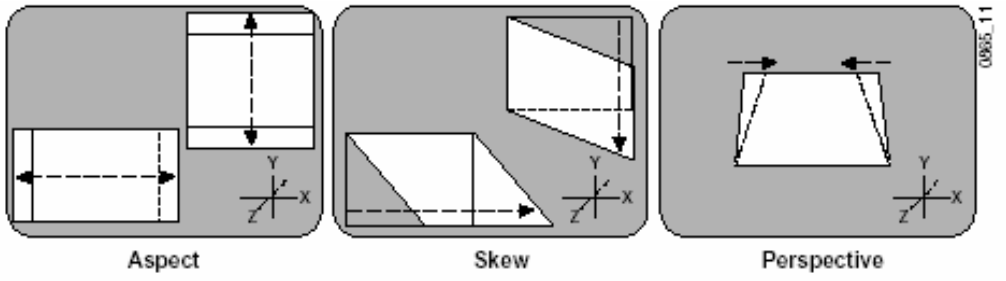


Figure 25 Aspect, Skew, Perspective

2.11.1.4 Aspect

Scaling the X or Y components of the picture. X axis changes affect horizontal size, Y axis changes affect vertical size (*Figure 25*). Z axis changes affect both X and Y dimensions, and is the same as Size.

2.11.1.5 Skew

Slanting the picture in the X (horizontal) and Y (vertical) directions (*Figure 25*).

2.11.1.6 Perspective

Changing the viewer's apparent viewpoint of a picture. This only applies when a picture is tilted so part of it is farther from the viewer.

The farther portion appears smaller than the closer portion, and the amount of perspective controls how much smaller the distant part is (*Figure 25*). Multi-channel perspective is discussed later in this section.

2.11.2 Axis Location

The axis location of the channel determines the center point of translations, spins, and rotations for that channel. You can move the axis to a new location to change the behavior of that channel. The axis location can be within or outside the screen area.

Z Axis Rotation at Different Axis Locations

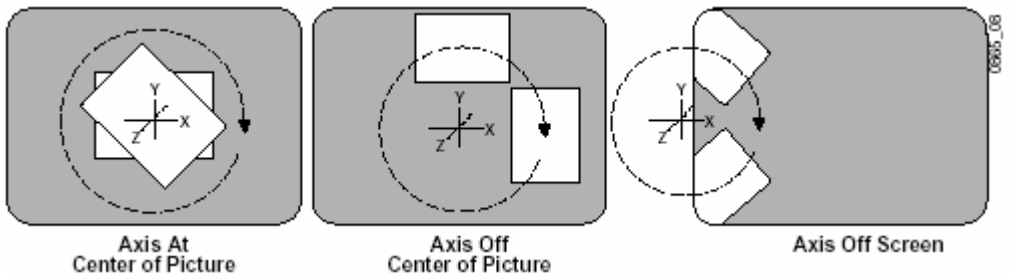


Figure 26 Frame of Reference Axis Locations

2.11.3 Source and Target Space

The KayakDD Digital Picture Manipulator uses source and target space frames of reference.

- Source space for a control channel uses that channel's coordinate system for reference.
- Target space for a channel uses the next higher level's coordinate system for reference.

Being able to use both source and target space can help make effects editing easier. One frame of reference may offer a simple and easy to understand context for a picture transform, while in another frame of reference the same transform may be difficult to understand and control. KayakDD Digital Picture Manipulator effects can also employ both source and target space directed transforms simultaneously, which can create complex and beautiful effects.
The simplest example for source and target space concerns a channel that has been rotated while the global channel remains unchanged.

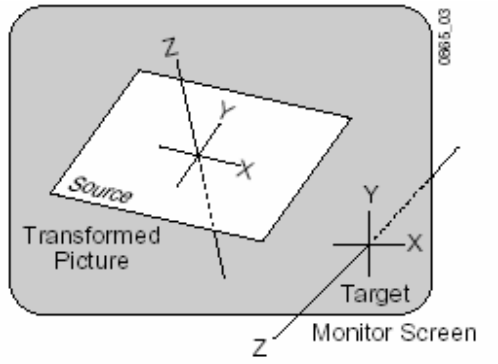


Figure 27 Source and Target Space

In this example the source space for the channel is referenced to the picture itself (tilted back at an angle) while the target space is referenced to the monitor screen (straight). X axis translations will move this picture differently, depending on whether source or target space is being used.

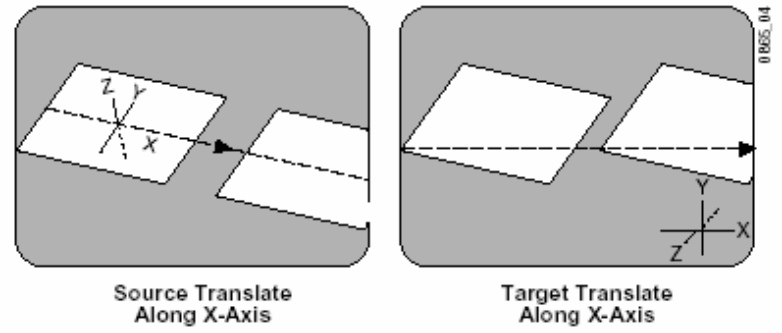


Figure 28 Source and Target Space Translation

If the channel is controlled by a global channel, and the global channel itself has been rotated, an X axis translation will depend on whether the channel itself or the global channel is being manipulated, and whether source or target space is being used (*Figure 29* and *Figure 30*). Note that the target translate of the channel is the same as a source translate of the global channel.

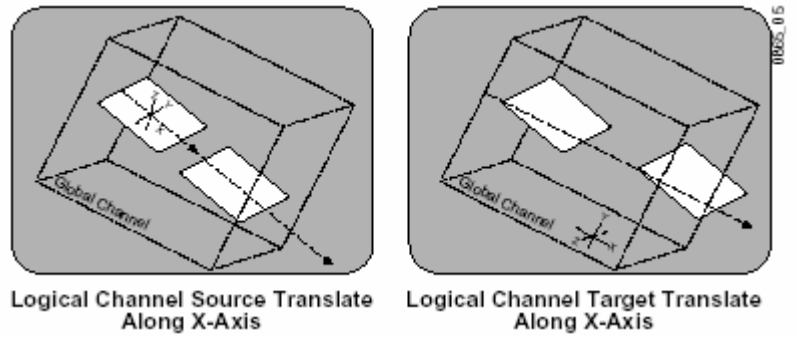

Global Channel
Logical Channel Source Translate Along X-Axis
Global Channel
Logical Channel Target Translate Along X-Axis

Figure 29 Channel Translate With Global Rotated

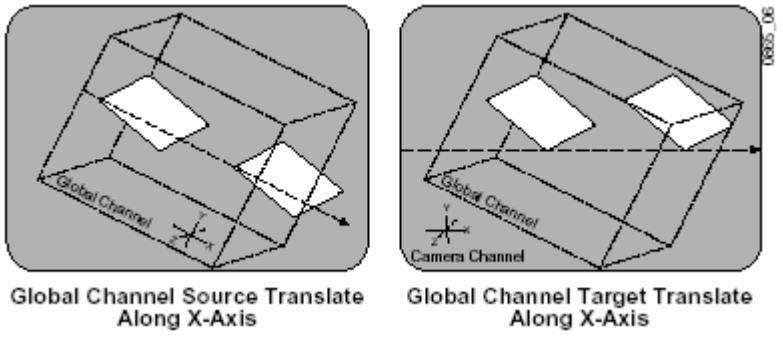


Figure 30 Global Channel Translate With Global Rotated

2.11.4 Post Transform Space

Post transform (**Post Xform**) is a special transform function that only affects size and location operations. It does not change the perspective of the image (*Figure 31*). This can be used as a convenient method to quickly project pictures onto new locations of the screen. For example, if an image has the right perspective but is partially off screen, it can be brought back on screen without changing the perspective.

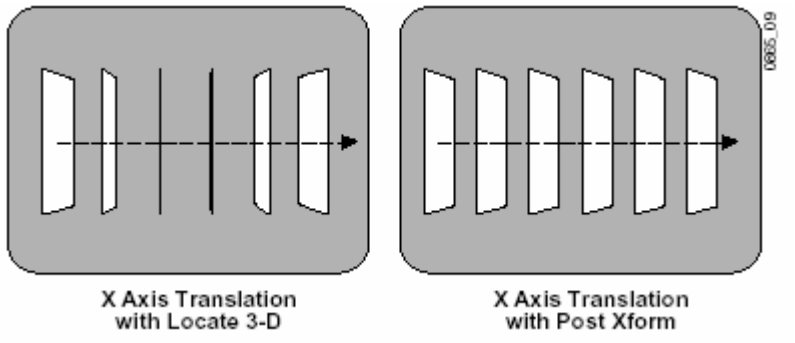


Figure 31 Post Transform Translation

All post transform functions are made relative to the monitor screen frame of reference. For example, a positive X post transform always moves to the right side of the screen.

2.11.5 Front and Back, Near and Far

Pictures manipulated by a KayakDD Digital Picture Manipulator have front and back sides, each of which is revealed in turn as the picture spins or rotates. After a picture has been translated it can be difficult to determine which side was originally on the front and which was originally on the back. This distinction can be important when, for example, different sources are being selected for different sides of an effect.
The KayakDD system uses a “Near” and “Far” convention to ease system operation. Near is always the side of the picture that is visible (facing toward the viewer), and Far is the hidden side of the picture (facing away from the viewer). The current Near side can be either the front side or the back side of the picture, depending on orientation. For example, to change the source on the visible image, just change the Near side. To change the source on the hidden side, change the Far side. You don’t need to know whether the image being changed is actually the front or back side.

2.11.6 Transform Numbering Systems

The KayakDD Digital Picture Manipulator uses the following numbering systems to precisely define picture locations, picture size, and picture rotation and spin.

2.11.7 Screen Coordinates

The KayakDD Digital Picture Manipulator accommodates two different aspect ratios, 4 x 3 and 16 x 9, selectable via the Video Standards menu. In 4 x 3 mode, the screen is six units high and eight units wide. In 16 x 9 mode, the screen is 18 units high and 32 units wide. The numbering system begins in the center of the screen, and has the standard horizontal X axis and the vertical Y axis (*Figure 32*). For simplicity, examples in this manual use the 4 x 3 aspect ratio.
These coordinates can be used for monitor screen locations (channel target space with default global channel), or they can be applied to picture locations (channel source space).

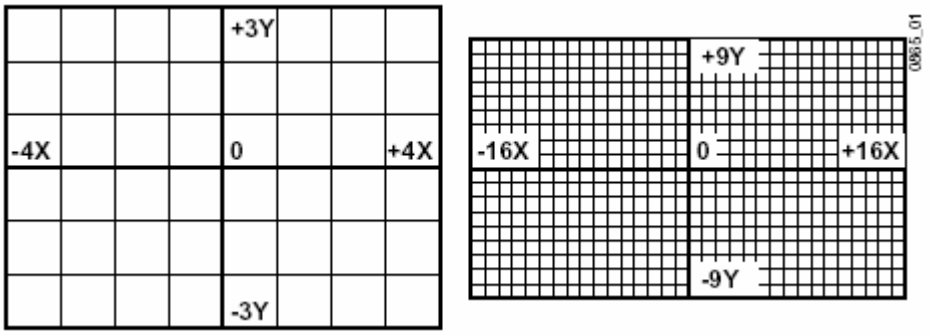


Figure 32 Screen Coordinates

Screen units are also used to define Z axis dimension depth in 3-D space. Positive Z axis values are back behind the picture, and negative values are in front of the picture (*Figure 33*).

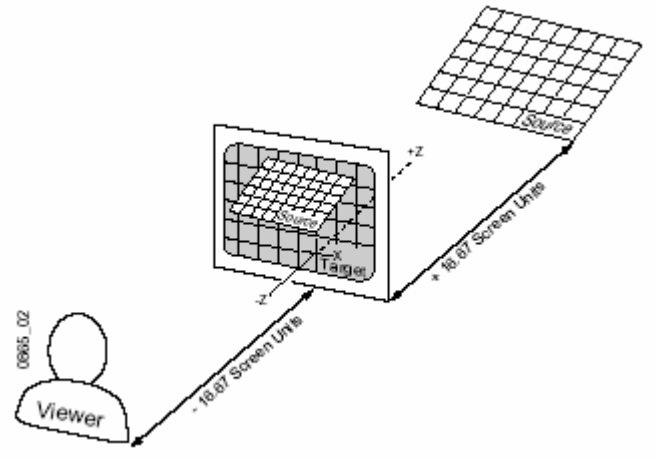


Figure 33 Viewer Location in 3-D Space

For perspective calculations the factory default viewpoint places the viewer -16.67 screen units from the monitor screen surface (4 x 3 aspect ratio). In this case, moving a full screen image 16.67 screen units back behind the screen makes the picture appear half its normal size to the viewer.

2.11.7.1 Size

Picture size is defined relative to picture screen units. A size of 0.50 indicates a picture is one-half its full size in linear edge measures. It is one quarter of its full size area.

2.11.7.2 Rotation

Rotation is measured fractionally with respect to 360°. A value of 0.25 indicates a rotation of 90 degrees; 0.50 indicates 180 degrees (maximum rotation).
Rotation values can be positive or negative, which determines the direction of rotation.

2.11.7.3 Spin

Spins are measured in number of 360° rotations (up to 999). Fractional spin values are also supported. A single axis 0.50 spin is the same as a single axis 0.50 rotation. Spin values can be positive or negative, which determines the direction of spin.

2.11.7.4 Skew

Skew supports values of ±999, though extreme values will probably rarely be used.

2.11.7.5 Aspect

Aspect values are in percentage of the original size, with 1.0 = 100%, 0.5 = 50%, etc.

2.11.7.6 Perspective

Perspective supports values from 0-100, with 0.06 as the default in 4x3 operation and 0.015 in 16x9.

2.11.8 Spin and Rotation Relationship

It is possible to use both Spin and Rotation at the same time in an effect. When both are used, the transforms are nested so that the values of one transform are applied after the previous transform values have been calculated.
This nesting provides increased control of the effect dynamics. Source and Target space also affects the transform nesting order.

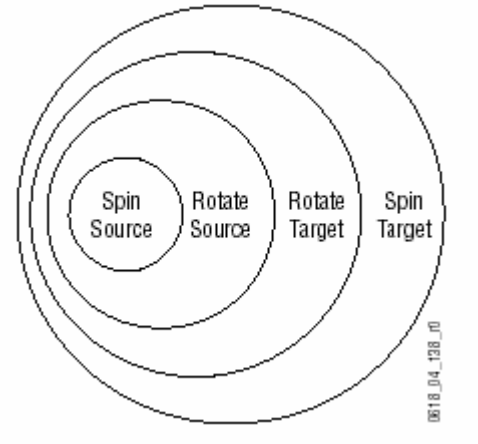


Figure 34 Spin and Rotate Transform Nesting

2.11.9 Path Control

2.11.9.1 Paths

Keyframes specify parameter values at specific times in an effect. Most of the duration of an effect, however, occurs between these keyframes. The KayakDD system interpolates parameter values between keyframes (in-betweening).
The trajectory, or path, a manipulated picture travels between keyframes is determined by how these in-between values are interpolated. The KayakDD system offers you several path controls (Figure 56):

- **HOLD** — No interpolation. Keyframes hold their values for their durations, then change all at once for the next keyframe.
- **LINEAR** — Applies a linear interpolation between keyframes; no acceleration or deceleration is applied. Movement is mechanical with a constant velocity.
- **S-LINEAR** — Applies a linear or straight line motion between keyframes, with acceleration and deceleration applied at the beginning and end of each keyframe. At each S-Linear keyframe the motion is stopped for two fields.
- **CURVE** — This selection causes a rounded path through the keyframe. Paths are user adjustable with path modifiers (tension, continuity, and bias) described below.

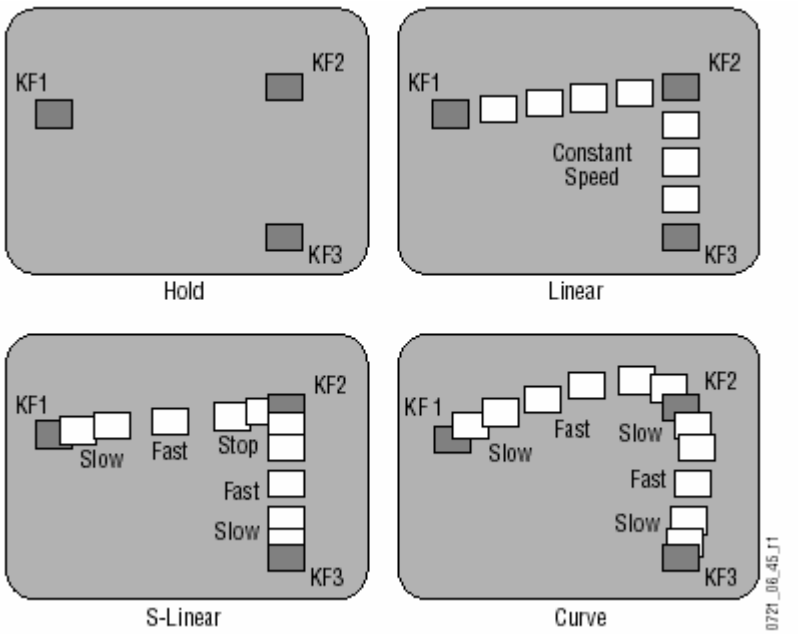


Figure 35 Path Types

The path concept can also be applied to functions that do not move a picture across the screen, like matte hue changes. For these functions, the rate of change of the parameter follows the same path types above. For example, an S-Linear hue rotation will accelerate and decelerate the speed of the hue change at the beginning and end of the keyframe.

2.11.9.2 Tension, Continuity, and Bias Controls

When the **CURVE** parameter is selected, additional fine-tuning path controls become available:

- **TENSION** — Controls the length of the tension vector. At a setting of 0.0, this imaginary line extends an equal distance into and out of the keyframe, and the path through the middle keyframe is curved.
- **CONTINUITY** — Determines the angle of the path into and out of the keyframe.
- **BIAS** — Determines whether the path will be pulled towards the previous or the following keyframe.

  In the following examples, a physical path is shown between three keyframes. The first keyframe (KF1) is the upper left square; the last keyframe (KF3) is the lower right square. The adjustments in these examples are applied to the middle keyframe only (KF2).

2.11.9.3 Path Vectors

With respect to the path between keyframes, each keyframe is made up of three vector parameters as shown below. The soft knob controls act on these vector parameters to adjust the path into (entry) and out of (exit) the keyframe. The path through KF2 is parallel to an imaginary line drawn between KF1 and KF3.

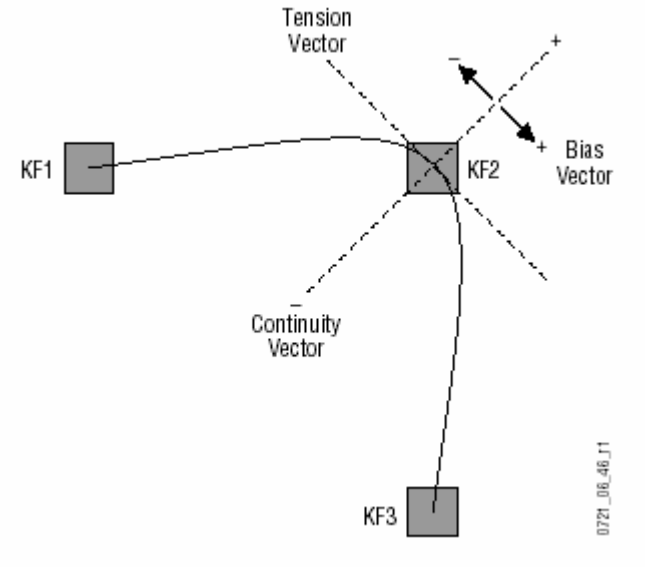


Figure 36 Path Vectors

2.11.9.4 Vector Values

Path vector setting values of ± 1.0 are available, same as the Thomson Grass Valley Kaleidoscope DPM.

2.11.10 Tension Control

In the example below, the keyframes comprise a right angle, so the **TENSION** control operates on a 45° line drawn through the keyframe. This line is referred to as the Tension Vector and is parallel to a line drawn between adjacent keyframes (*Figure 37*).

The **TENSION** soft knob controls the length of the tension vector. The length of the tension vector is inversely proportional to its parameter value. For example, at a Tension setting of 0 (zero), this imaginary line extends an equal distance into and out of the keyframe, and the path through the middle keyframe is curved. The unmodified KF2 is said to have a correction value of 0.0.

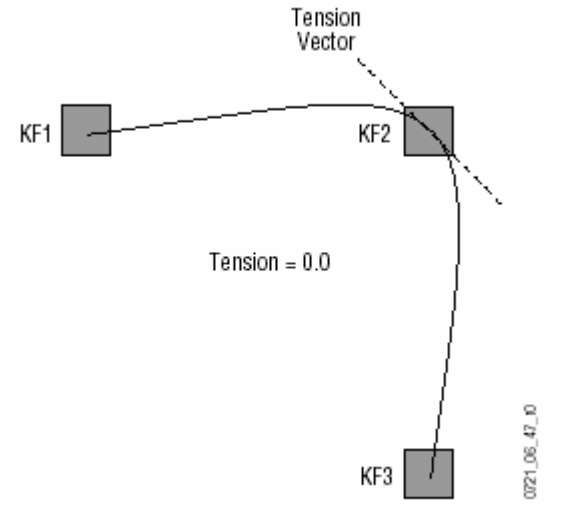


Figure 37 Tension Control Setting Zero

In the example below, the **TENSION** control is increased to 1.0, so that the Tension vector is shortened to non-existence through KF2 (*Figure 38*). The path enters and leaves the middle keyframe in a straight line as it takes on an S-Linear motion; decelerating as it enters the middle keyframe and accelerating as it leaves.

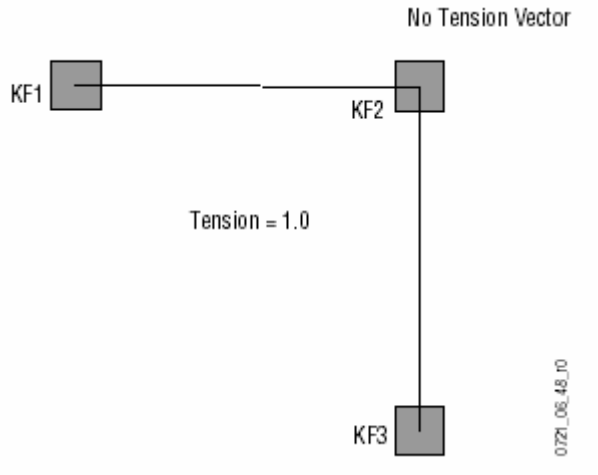


Figure 38 Tension Control Setting 1.0

In the example below, the **TENSION** control has been set to -1.0. This lengthens the Tension vector, causing the path through the middle keyframe to be longer and broader (*Figure 39*). The longer path will appear to make the image speed up through KF2 as it travels from KF1 to KF3.

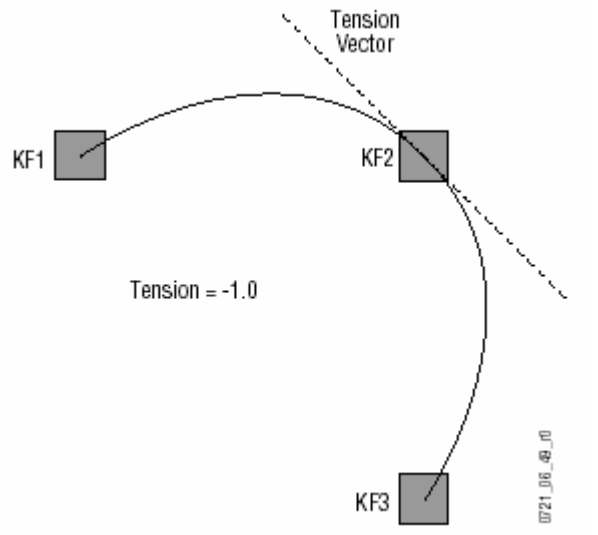


Figure 39 Tension Control Setting - 1.0

2.11.11 Continuity Control

The continuity adjustment determines the angle of the path into and out of the keyframe. It is represented by a vector 90 degrees to the tension vector (*Figure 40*). The unmodified path shown is identical to the unmodified path of the other controls.

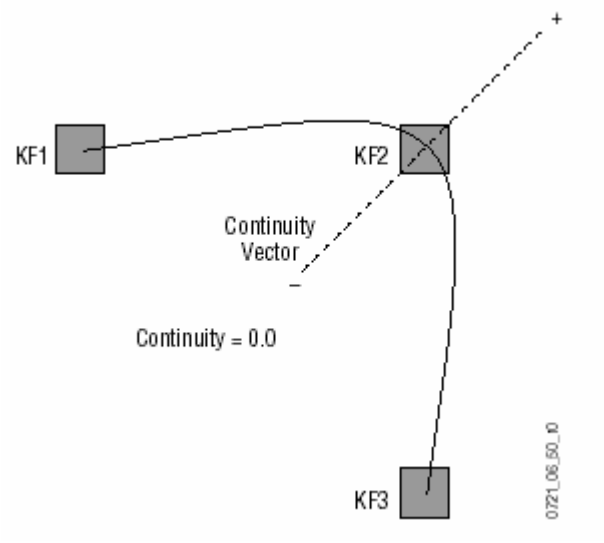


Figure 40 Continuity Control Setting Zero

With continuity set to 1.0, the entry path through the keyframe is pulled positively along the continuity vector. The effect of 1.0 continuity is that of motion dropping into and then out of the keyframe, similar to a bouncing ball (*Figure 40*).

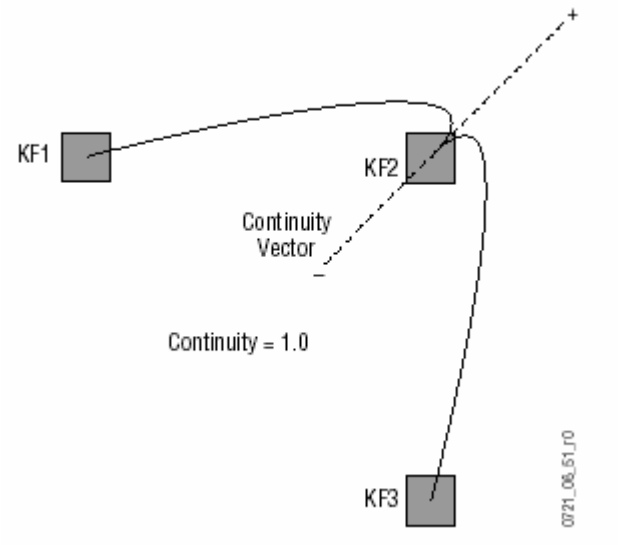


Figure 41 Continuity Control Setting 1.0

With continuity set to -1.0, the paths between the keyframes become straight lines, accelerating into the keyframe and decelerating as it leaves the keyframe.

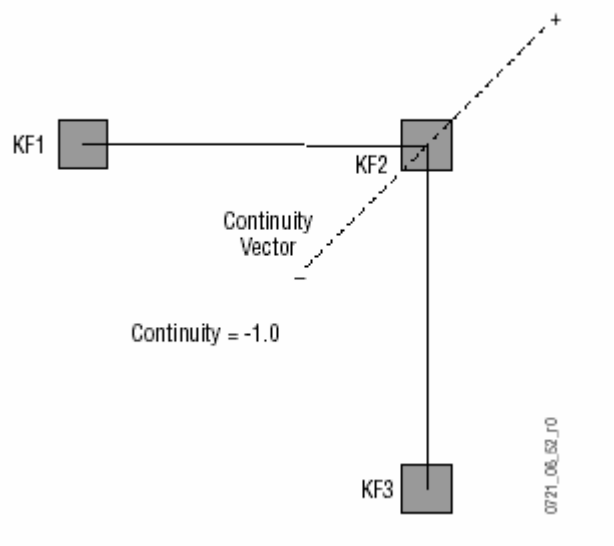


Figure 42 Continuity Control Setting - 1.0

2.11.12 Bias Control

The **BIAS** control determines whether the path will be pulled towards the previous or the following keyframe. With extreme settings, all of the biasing will occur either before or after KF2. With bias set to 0 (zero), the curve through the keyframe is gentle as shown in *Figure 43*.

NOTE!
A Tension vector must be present for Bias control to be available.

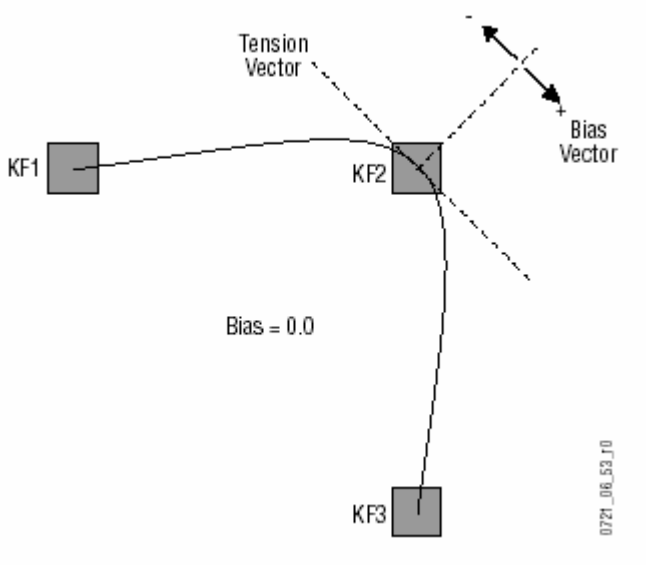


Figure 43 Bias Control Setting Zero

With the bias set to 1.0, the path is pulled towards the following keyframe. Entry into and exit from the keyframe is a straight line from the previous keyframe, and the path of the effect travels completely through KF2 before turning towards KF3.

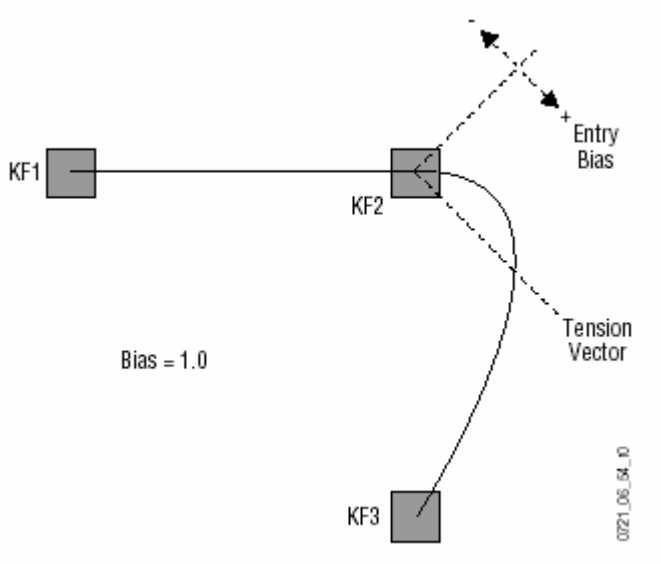


Figure 44 Bias Control Setting 1.0

With the bias set to -1.0, the path is pulled towards the previous keyframe. Entry into and exit from the keyframe is a straight line to the following keyframe.

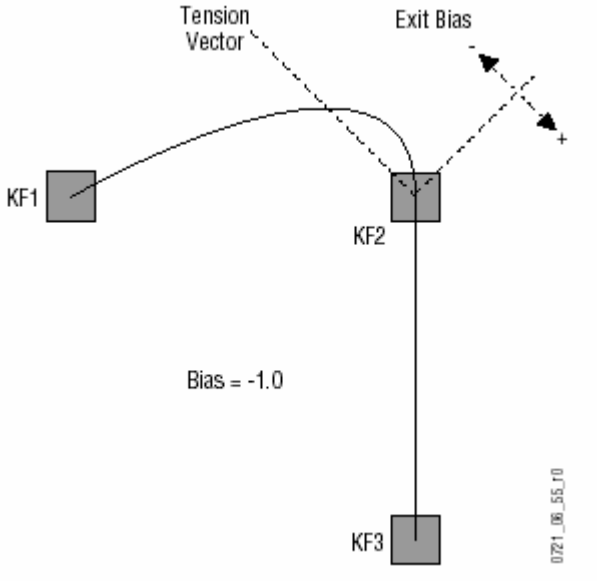


Figure 45 Bias Control Setting - 1.0

2.11.13 Sure Touch

"Sure Touch" changes the way in which effects behave during recall and playback, providing more control and flexibility. An effect can be safely recalled using two new modes which eliminate abrupt changes: hence the name "sure touch" is being used. When using a Sure Touch mode, the effect adapts itself to the switcher's current state. Upon recall of any effect, no changes are made to the current state, regardless of the nature or the composition of the effect. Then, when the effect is run, the relative changes from the interpolated effect are applied instead of the traditional absolute output. Only elements which changed over the course of the original effect are affected.
One way of thinking about safe touch is to think of it as running an effect in "relative" mode.
These changes can be applied in different ways, allowing the effect to interpolate on a path parallel to the original effect (**Parallel** mode), or on a path that converges the changing state smoothly to the actual end state of the original effect (**Converge** mode). A safe touch mode can be "forced on" just prior to recalling an effect, or it can be saved with the effect to be used automatically.
This feature changes the paradigm of control for effects, allowing effects to be applied under more flexible set of conditions and also to be used as specialized functions to perform specific actions.

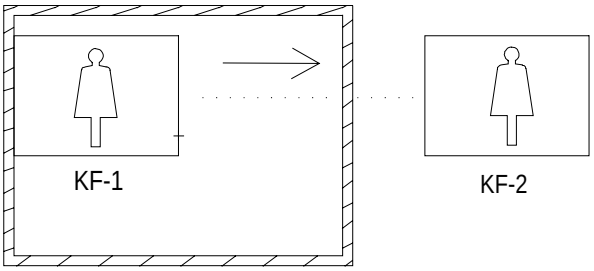
Within the DPM timeline system, when an effect is first created, a snapshot of all values is saved. For any subsequent keyframes, only values which have changed are then saved. Those values that have changed are referred to as "bound elements" and are subject to interpolation as the effect runs.
When an effect is recalled in a sure touch mode, the current states of the bound elements are read by the timeline system. These values are compared with the original first keyframe (snapshot) of the effect, and an "offset" or "new zero" is established for each bound element of the effect. This "offset" is then applied during all subsequent fields of the effect. A new "offset" is established each time the effect is recalled. The result is that a "new effect" is established each time the effect is recalled.

The essential result is this: When an effect is recalled in a safe touch mode, only those values which underwent changes after the first key-frame of the original effect are touched, and only changes in values are applied.

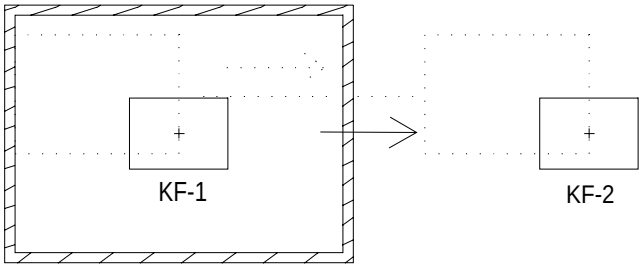
2.11.13.1 Parallel Mode Example

For example, suppose we have the following effect.

- Effect 3: The channel is at 50% size and on screen in the upper left. It is moved off screen to the right.
- Keyframe 1: locate X = -2.0, locate Y = 1.0, size = 50%.
- Keyframe 2: locate X = 8.0.



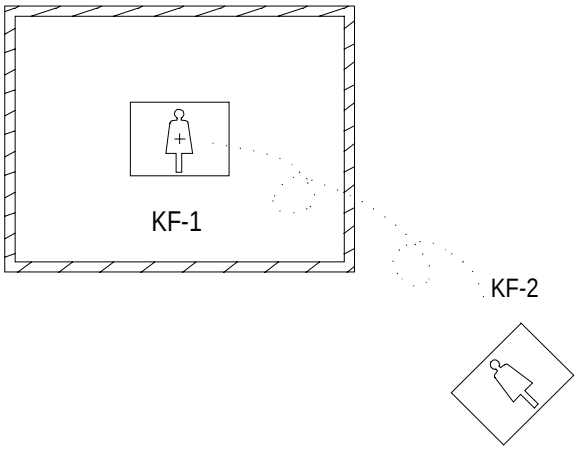
Now suppose that the image is centered and size = 30%. Next, effect 3 is recalled in sure touch “parallel” mode. The result would look like this:



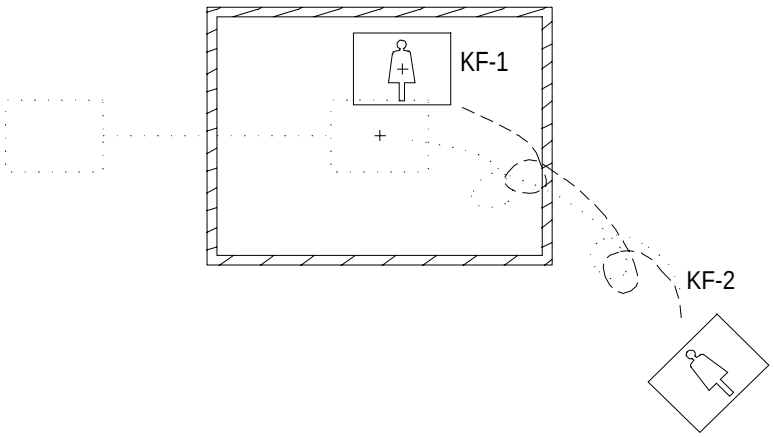
2.11.13.2 Converge Mode Example

Sure touch converge mode begins in the same way as parallel mode, but the effect converges to the absolute end state of the effect over the course of the effect.

- Effect 2: Starts with the image centered and 30% size. Image is spun off screen to the right and down
- Keyframe 1: size = 30%
- Keyframe 2: locate X = 8.0, locate Y = -6.0, spinZ = 1.875.



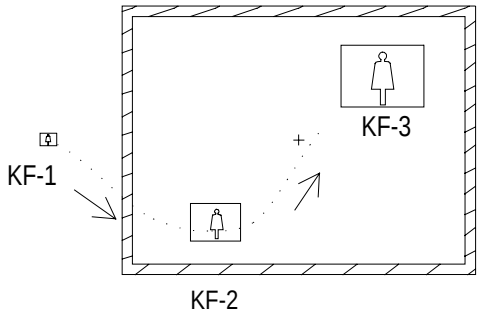
Now suppose the starting image is moved up and right and then effect 2 is recalled with sure touch “converge” mode. The result would appear as shown here. The effect converges towards the original effect over the duration of the effect. The final keyframe of the effect would set the location and spinZ to exactly the same values as in the original effect.



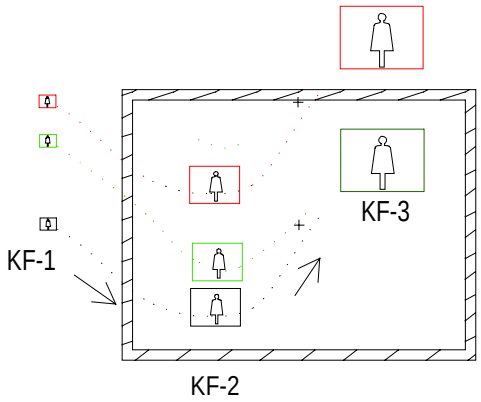
2.11.13.3 Comparing Parallel and Converge Modes

Suppose we have an effect 5 which is as follows:

- Effect 5: The channel is 5% size, off screen to the left, and moves in a sweeping path towards the lower left screen and finally ending in upper right at 25% size.
- Keyframe 1: size = 5%, locate X = -6.0.
- Keyframe 2: size = 15%, locate X = -2.0, locate Y = -2.0.
- Keyframe 3: size = 25%, locate X = 2.0, locate Y = 1.5.



The result of moving the starting image location and recalling this effect in parallel mode (red) and converge mode (green) is shown here.



Obviously, there are ways to use sure touch which would create a bad result, as in the red case.

3 Control Panels

3.1 Overview KayakDD-1 Panel

- Sources are selected in the crossbar section on the left bottom side of the panel.
- Basic key control, DPM/Ram/MP/E-MEM/MaKe selection and transition control are handled in the middle sections.
- The graphical menu in the top section allows full control and edit facilities.
- The positioner subpanel in the upper right provides easy positioning of DPM, wipes, and pattern keys.
- The separate Cut/Auto buttons in the bottom right section allow keyer control independent from the transition section.

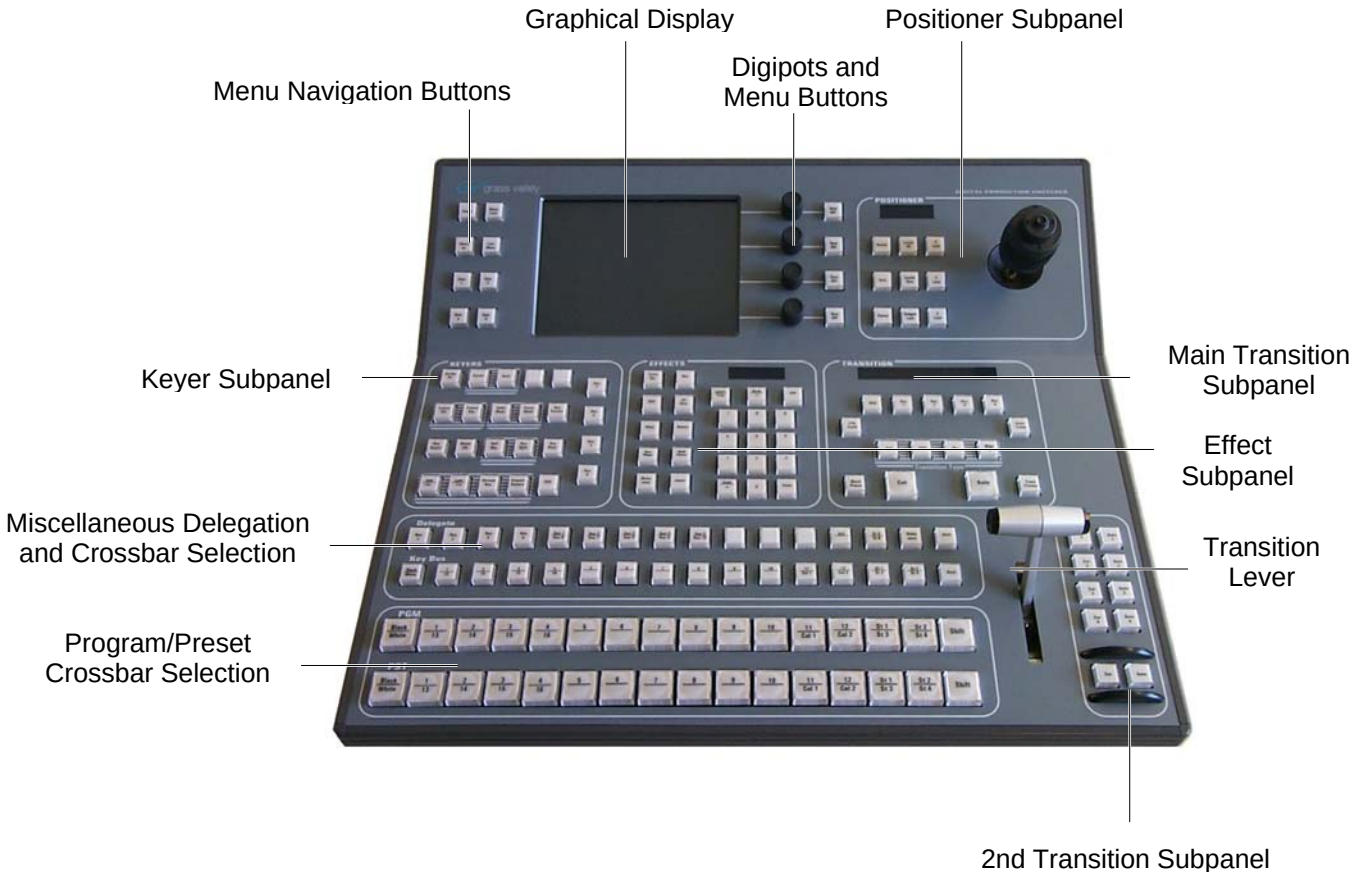


Figure 46 Overview KayakDD-1 Control Panel

3.2 Overview KayakDD-2 Panel

- The top section of the panel with Keyer subpanel, Effect subpanel, Positioner subpanel, Display and gadgets buttons can be delegated to M/E or P/P,
- Sources are selected in the M/E1 and P/P crossbar section on the left bottom side of the panel.
- The graphical menu allows full control and edit facilities.
- The positioner subpanel provides easy positioning of DPM, wipes, and pattern keys.
- Transition control for M/1 and P/P are handled in the right sections of the panel.
- The separate Cut/Auto buttons on the right of he transition lever allow keyer control independent from the transition section.

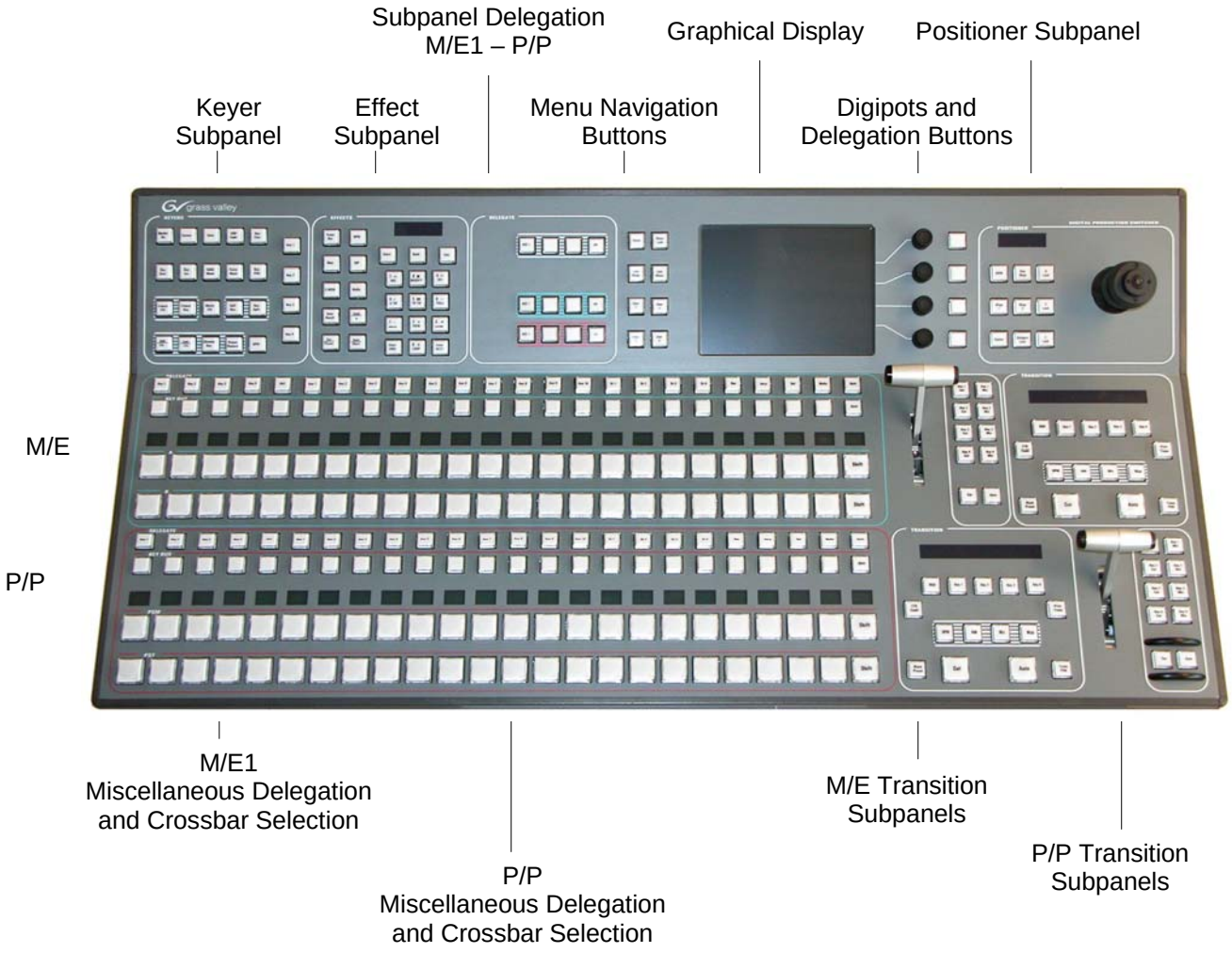


Figure 47 Overview KayakDD-2 Control Panel

3.3 Background Bus Selection

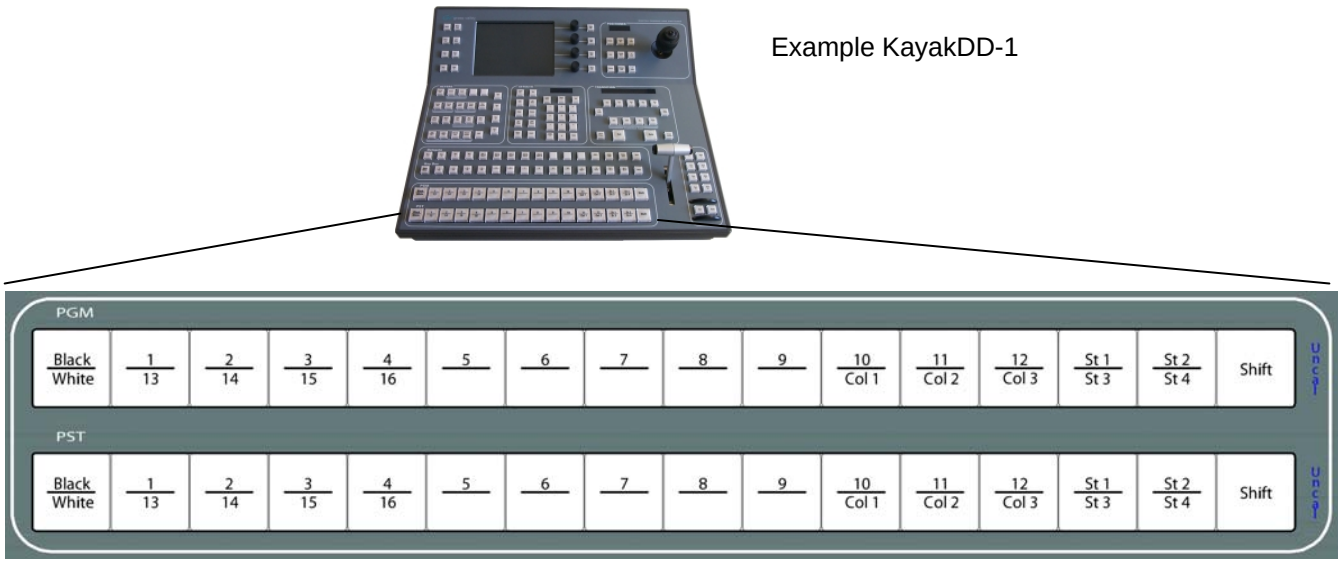


Figure 48 Subpanel Background Bus Selection

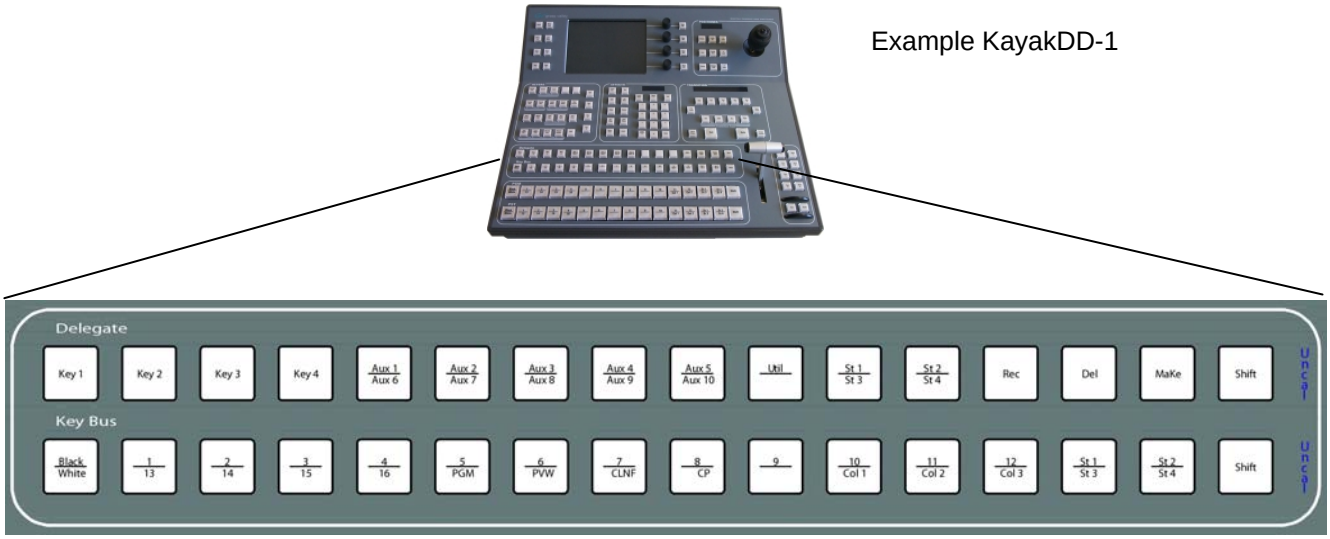
Sources are selected on the PGM and PST row. Each row contains 15 source buttons and a Shift button. Only one source at a time can be selected for each bus on the row of interlocked buttons. If more than one button on a row is pressed, the last pressed one will be executed.
Holding down a source select button when recalling an E-MEM register performs a source override. That source will be held on that bus even if a register is recalled and/or run that specifies a different source as long as the source button is held.

3.3.1 Unshifted and Shifted Sources

Of the available external 16sources, 12 are mapped to the unshifted source selection buttons, and 4 to shifted buttons. The resting buttons of the unshifted source selection buttons and some of the shifted buttons are used for internal sources like black, stillstores, and color backgrounds.

When the **Shift** button is not pressed, the row of source selection buttons accesses inputs 1 to 12. When the **Shift** button is held down, it lights and the row of crosspoints now accesses inputs 13 to 16. If a selection is made on the shifted bus, the **Shift** button remains lit to indicate the tallied input is shifted. If another selection is made without holding down the **Shift** button, the row returns to an unshifted state and the **Shift** button light goes off.

3.4 Miscellaneous Bus Selection



The top row of this section is the bus delegation row. Since there are more than 16 buses to be delegated, a shift button is used to access the according delegations. Within the bus delegation row the buttons can be unshifted and shifted in the same manner as the Background buses. Buttons which have a shifted layer are marked blue in the drawing above.

When a bus is selected in the bus delegation row, the currently selected source or the last recalled macro will light on the bus selection row. Selecting a different source / macro will change the bus selection.

3.4.1 Available Bus Delegations

3.4.1.1 Key1 – Key4

A button press in the bus selection row selects the fill signal and the coupled key signal for the according keyer. This coupled key signal is defined in the key couple table in the setup menu. For use of a separate key signal see the description in the Key Section.

3.4.1.2 Aux1-Aux10

The aux buses can be delegated in two groups, unshifted Aux1-Aux5, shifted Aux6-Aux10.

3.4.1.3 Input Still Stores

The Stillstore inputs can be delegated in two groups, unshifted Stillstore 1+2, shifted Stillstore 3+4.

3.4.1.4 Utility

Selecting the **Util** button delegates the selection bus to be the Utility bus source selector. A crosspoint selected on the Utility bus can be used as a key signal.

3.4.1.5 Macro

Selecting the **Macro** button delegates the selection bus to be a set of macro function buttons. Only in Macro delegation the two buttons **Rec** and **Del** left to the macro button (gray in the drawing) are active. Selecting a button in the bus selection row while holding down the **Rec** button starts recording a macro at that button position. Any previously stored macro at that position is cleared.

Selecting a button in the bus selection row while holding down the **Del** button deletes the macro at the according button position.
Holding down the Macro button for longer than 2 seconds lights all buttons with active macros in the bus selection row.
While recording a macro you can insert a pause. To do so press **Rec** and **Del** simultaneously. Now you can enter the time for the pause using the key pad in the **Effect** section. The maximum pause time is 25.5 seconds. If you need longer pauses you can add more than one pause.

With macro delegation all 16 buttons serve as macro positions, that means, also the button labeled “shift” button is a macro button, allowing to record and play a total of 16 macros.

Within all other delegations, the bus selection row can be unshifted and shifted in the same manner as the Background buses.

3.5 Transition Control

3.5.1 Overview

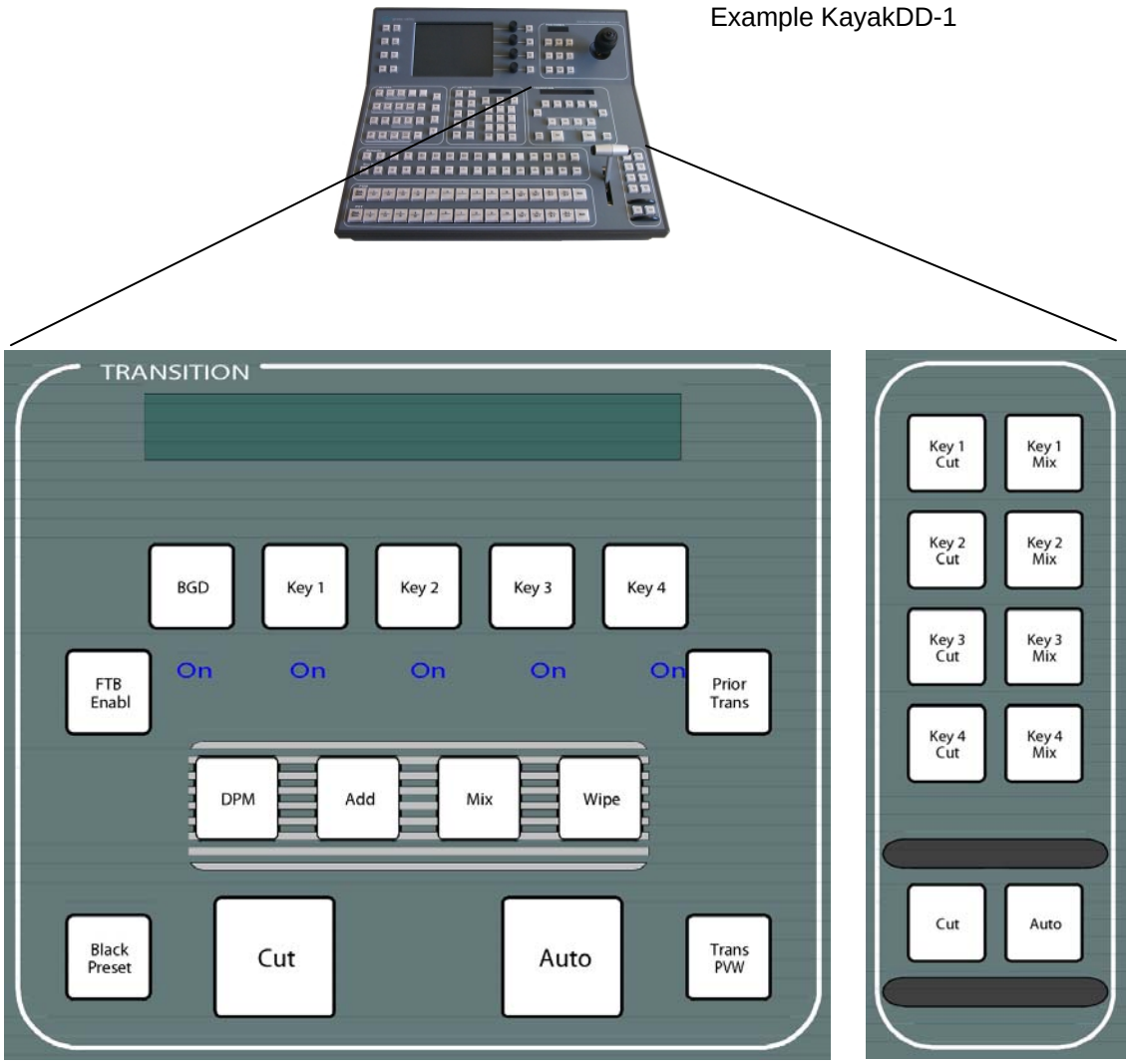


Figure 49 Subpanel Transition Control

The transition control is performed in 3 sections.

- Main Transition Subpanel with all main controls for transitions
- Transition Lever Arm (Fader) for manual transition control
- 2nd Transition Subpanel with separate cut/mix per keyer and fade to black

3.5.1.1 Main Transition Subpanel

The transition controls are used to select the signal elements that will be involved in the transition (background or keys), define the type of transition, and perform the transition.

3.5.1.2 2nd Transition Subpanel

These transition controls allow the operator to cut or mix the separate keyers with individual transition times. The Cut and Auto buttons at the bottom or used to cut or auto trans Fade to Black.
This Fade to Black function can be enabled with the FTB Enable button in the Main Transition Subpanel.

NOTE!
In a later software version the Fade to Black Cut & Auto buttons as well as most buttons of the Main Transition Subpanel will be user programmable.

3.5.1.3 Transition Elements

The **Key 1 – 4** and **BGD** buttons select the elements that will change during the next transition. Pressing these buttons does not change the current output of the switcher, but prepares for a change (the next transition).
Pressing one transition element button automatically turns off the others in this group. More than one transition element can be selected by holding down one button while pressing another in the group. Elements not selected remain in their current state when the transition is performed. For example, if **Key 1** is on and is not selected as part of the next transition, it will remain on during and after the transition.

The **BGD** button selects a change in the background buses. The result will be a transition from the current source on the PGM bus to the source selected on the PST bus. After the transition, the buses will flip flop, so the PGM bus always remains the on-air bus. The PGM bus selection remains the background source if this button is not selected as part of the next transition.

The **Key 1-4** buttons selects the keyers that will be involved in the next transition. The keys currently visible on the output of the switcher are identified by the **On** indicator lights below each button. Note that a key may be on but not visible (for example, half way through a preset black transition).

The **Key Prior** button selects a change in the key priority. The layering order (stack) of the keys will transition from the current stack to a new stack specified by the operator. The new key priority stack is defined using the **Key Prior** button in the Keyers subpanel or via a menu.

3.5.2 Transition Types

The **DPM, Add, Mix, Wipe**, and **User Tran** transition type buttons select what type of transition will be used on the elements selected above for the next transition. Pressing these buttons does not change the appearance of the current output of the switcher. Only one transition type can be selected at a time.

- The **DPM** button is only available for Key Transitions. If the Background is selected for next transition in combination with keyers, the background will perform an add/mix/wipe transition, depending on the last transition type selected prior to the **DPM** selection. This type will be indicated in the display above the BGD button.
  The behavior of a **DPM Key Transition** is as follows:
  In a mix/wipe transition the **Lever Arm** or the **Auto Trans** control the video amount of the keyer. In a DPM transition the **Lever Arm** or the **Auto Trans** control the timeline of the DPM effect selected for this keyer.
  When the key was off at transition start, the video amount of the keyer is fully switched on at transition start, allowing to fly the key in.
  When the key was on at transition start, the video amount of the keyer is fully switched off at the end of the transition, allowing to fly the key out.

  NOTE!
  The DPM effects used for transitions should be build in a way that the last keyframe is out of screen or size zero.

- The **Add** button selects a Full Additive Mix as the next transition.

- The **Mix** button selects a mix as the next transition.

- The **Wipe** button selects a wipe as the next transition. Each wipe is predefined using either the complex wipe generators or the Utility buses as the wipe shape. Wipe pattern selections are made in the Wipe menu.

- The **User Tran** button selects customized user defined transition settings. Specialized enhancements and combinations of transition effects, including Mix through Video, FAM (Full Additive Mix) or DPM (Digital Picture Manipulator) transitions, can be programmed into a user transition.

  NOTE!
  ***User Tran** is not supported in the software release version 1.0. Since the number of buttons for transition types is limited, User Trans would only be accessible via menu or after having reprogrammed buttons in the Main Transition Subpanel (later software).*

3.5.3 Performing Transitions

The **Cut** and **Auto Trans** buttons and the Transition Lever Arm are used to perform main transitions. After a transition completes, the background source selections flip-flop, readying the PST bus for the next source selection. The progress of a transition is indicated by the up and down arrows to the left of the lever arms.

The **Cut** button instantaneously replaces the selected elements with their new sources or states, regardless of the transition type selected. The button will light briefly to confirm the operator's action.

The **Auto Trans** button starts an automatic transition of a predetermined rate. The button will light during the transition. Pressing **Auto Trans** a second time during a transition stops the transition at that point. The transition can then be completed by pressing the button a third time or by moving the **Transition Lever Arm** to its opposite limit.

The **Transition Lever Arm** is used to manually perform a transition. You can move the lever in either direction to run a transition due to the flip-flop architecture of the buses. Moving the lever from one limit to the other performs a complete transition. It is possible to start a transition with the lever, then stop moving the lever at any point, reverse its direction, and even return it to the original limit without completing the transition.
If the **Transition Lever Arm** is not in an end position when recalling an effect or performing an **Auto Trans** the lever arm is resynced by recalculating the resting lever arm way to complete the transition in the direction of the arrow. Moving the lever arm in the opposite direction allows the operator to resync the arm to an end position without affecting the output signal.

3.5.4 Preset Black

The **Preset Black** button modifies a main transition so that it will go through black, instead of going directly to the new state. This is an alternate action button (pressed to turn it either on or off). The **Preset Black** button lights when it has been selected.
Two successive transition commands (**Auto Trans** button, **Cut** button, or Transition Lever Arm action) are used for a complete preset black transition.
The first command transitions the switcher to black (first stage). When in black, both the PGM and PST bus selections will go low tally. The second command transitions from black to the final stage, completing the preset black transition.
The preset black function is canceled automatically at the end of the second transition.
The transition type can be changed when the M/E has reached its first preset black stage, allowing for example a wipe to and a mix from preset black. While in preset black, the key ON indicators report the states the keys will have when the second transition command completes. The keys involved can be changed at this time, if desired. The source on the PST bus can also be changed while in the preset black stage.
A preset black transition can be canceled by pressing the **Preset Black** button a second time. If cancelled while at the preset black stage, the system will switch back the original signal. Pressing a source button on the PGM bus will also cancel a preset black transition. The source pressed on the A bus will immediately be placed on air without any keys, even if the next transition had specified key changes.

3.5.5 Transition Preview

The transition preview feature allows a main transition to be previewed without affecting the program output. A transition preview cannot be performed if the Transition Lever Arm or main transition is off limit, if an auto transition is in progress, or when Preset Black has been selected.
Pressing **Trns Pvw** routes the main transition video to preview output and disables program transitions on that M/E, leaving the existing program output unchanged. Pressing **Auto Trans** or moving the Transition Lever Arm with **Trns Pvw** active will show the transition only on preview, allowing the setting of wipe parameters or adjusting auto transition times before actually performing that transition. Transition preview overrides whatever preview mode is currently selected.
Transition preview may be canceled at any time by pressing the lit **Trns Pvw** button. If an auto transition preview is in progress, it will be aborted. If the transition lever arm was used for the transition preview, canceling the preview part way through will cause the lever arm to resync by recalculating the resting lever arm way to complete the transition in the direction of the arrow. Moving the lever arm in the opposite direction allows to resync the arm to an end position without affecting the output signal.

3.5.6 Transition Rates

Auto transition rates are set using the Trans Rate button and keypad located on that Effects subpanel.
When the **Trans Rate** button is pressed, the **Auto** button in the Main Transition subpanel and the four Key 1-4 Mix buttons and the **Auto** button in the 2nd Transition Subpanel will flash and the Effects readout prompts for the rate to be set.
Pressing one of the flashing buttons delegates the Effects keypad to that transition rate and its current rate appears on the readout. A time entry is then expected on the keypad in seconds, frames, field format.

3.5.7 Other Transition Control Interactions

The Transition Lever Arm can be used in combination with the **Auto Trans** or **Cut** button to perform a main transition. For example, you can start the transition
by moving the lever off its limit, and finish the transition by pressing **Auto Trans**. Moving the lever part way, then pressing **Cut** will complete the transition with a cut. The lever arm will be resynced by recalculating the resting lever arm way to complete the transition in the direction of the arrow. Moving the lever arm in the opposite direction allows to resync the arm to an end position without affecting the output signal.

3.6 Keyer Subpanel

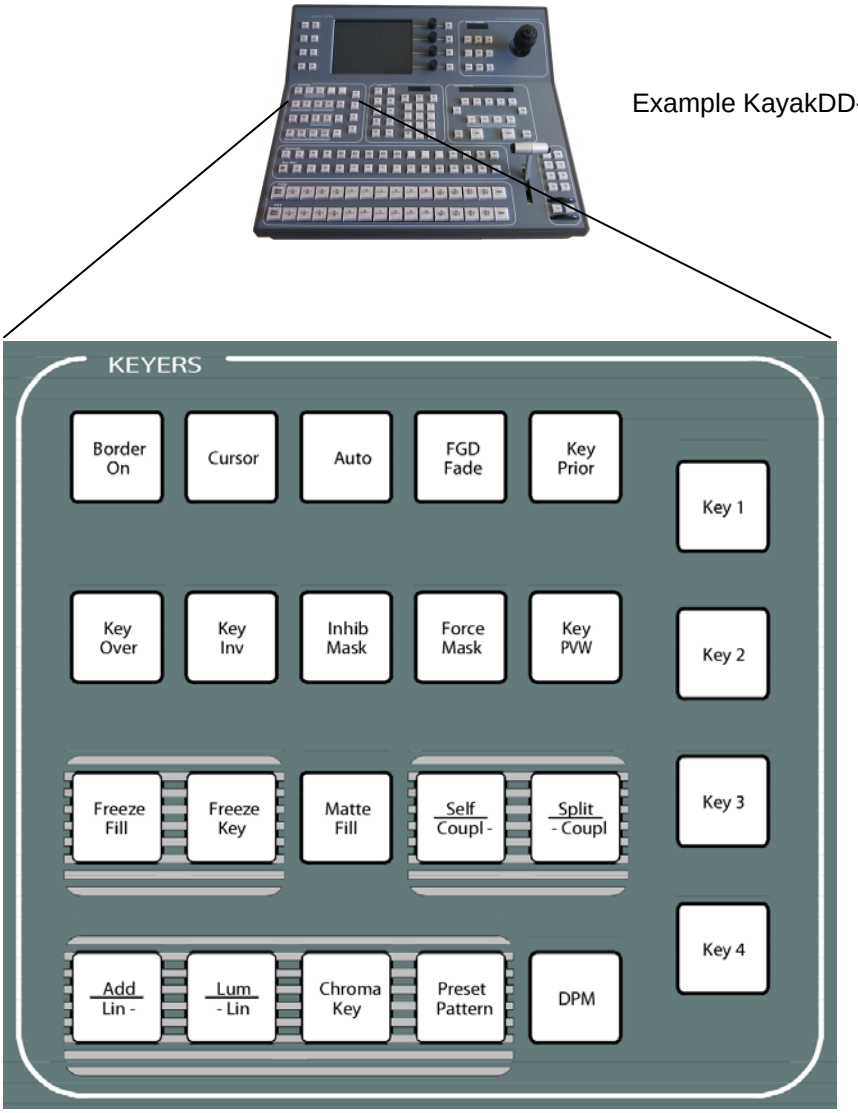


Figure 50 Subpanel Keyers

3.6.1 Key 1...4

These buttons delegate the Keyers Panel and indicate which keyer is currently delegated to the Keyers Panel.
Due to the **Auto delegation** the keyers panel is automatically delegated to the appropriate keyer when it makes sense.
When **Auto Menu** is enabled, the menu display of the attached side panel will switch to the appropriate **Key Menu** and sub-menu. Parameter adjustment is performed by the menu digipots.

3.6.2 Key Types

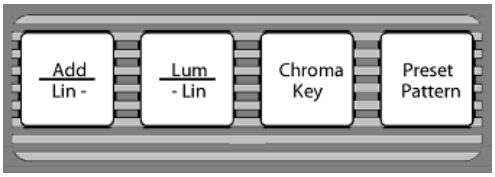


Figure 51 Key Type Buttons

NOTE!
*The **Add Lin** and **Lum Lin** buttons allow selecting three different operational modes (see below).*

The buttons are lit as follows:

Key function	Add/Lin (Lin Key)	Lum/Lin (Lum Key)
Additive key	YES	NO
Multiplicative key Gain = unity	YES	YES
Multiplicative key Gain <> unity	NO	YES

3.6.2.1 Add Key

Button **Add Key** serves to select the additive key mode. In this mode, an external unit (e.g. modern caption generators, paint systems) generates and supplies the key signal and the associated fill signal.
The background signal is multiplied with the key control signal and added to the supplied fill signal. This mode ensures that the supplied fill signal is not influenced and that all details contained in it are reproduced true to the original.

NOTE!
Please note that the supplied fill signal must be on top of a black background. Otherwise, the addition of the signals will yield a discolored background signal.

3.6.2.2 Lum Key

Button **Lum Key** selects the luminance key mode. The key control signal is derived from the luminance component of the key source signal. The key control signal controls the transition between background and foreground (=fill) signal.

3.6.2.3 Lin Key

Pressing the two buttons **Add / Lin** and **Lum / Lin** sets the luminance key to a linear mode. The key control signal corresponds to the non-amplified and unlimited luminance signal.

3.6.3 Preset Pattern Key

The Preset Pattern button selects Preset Pattern, which cuts the hole in the background using an internal wipe pattern generator (or Utility Bus video), rather than a source's key cut signal.
Wipe pattern selection and other preset pattern adjustment such as softness of the preset pattern edge and size of the preset pattern shape can be adjusted in the Wipe menu. The Joystick in the Joystick subpanel, when properly delegated, controls the location of the preset pattern on the screen.

NOTE!
The Preset Pattern and Masking features share common keyer hardware. When a Preset Pattern is being used by a keyer, masking will be disabled for that keyer.

3.6.4 Key Sources

3.6.4.1 Matte Fill

The Matte Fill button serves to select a color matte as a fill signal for the respective key in place of the Fill bus signal.

3.6.4.2 **Self Key Button / Key Split Button** (Software V618)

When the Miscellaneous Bus is delegated to a keyer, a source selection always selects the Fill signal for the according keyer. The Self Key/Key Split buttons define the way in which the key signal is selected.
If Self Key is selected, the selected Fill signal is also used as key signal.
If Key Split is active, a selection of the Fill signal does not change the key signal. To select the Key signal, hold down the Key Split button and select the key source on the Miscellaneous Bus.

NOTE!
If you want to see in Split Key mode which source you have selected as key source, press Split Key. The Key Buses row will indicate the source as long as the button is held down.

If none of the two buttons is active, the selection is done in coupled key mode.
In Coupled Key selection mode, the operator selects a Key Fill source on the Key Buses row and the switcher automatically selects the Key Source signal using the Coupled Key table.

The Coupled Key table is defined in the menu.

The default table entry for Coupled Key is the input itself. For DVEs, character generators, graphics, etc., the input where the Key signal from such an image source is connected should be coupled to the input where the video signal is connected.

3.6.4.3 Self/Couple Key Button / Split/Couple Key Button (Software V622 and higher)

When the Miscellaneous Bus is delegated to a keyer, a source selection always selects the Fill signal for the according keyer.
The Self/Couple and Split/Couple buttons define the way in which the key signal is selected.
If Self/Couple Key is selected, the selected Fill signal is also used as key signal.
If Split/Couple is active, a selection of the Fill signal does not change the key signal. To select the Key signal, hold down the Split/Couple button and select the key source on the Miscellaneous Bus.

NOTE!
If you want to see in Split Key mode which source you have selected as key source, press Split/Couple Key. The Key Buses row will indicate the source as long as the button is held down.

If **both** of the two buttons are active, the selection is done in coupled key mode.
In Coupled key selection mode, the operator selects a Key Fill source on the Key Buses row and the switcher automatically selects the Key Source signal using the Coupled Key table.

The Coupled Key table is defined in the menu.

The default table entry for Coupled Key is **White**. For DVEs, character generators, graphics, etc., the input where the Key signal from such an image source is connected should be coupled to the input where the video signal is connected.

3.6.4.4 Overview Key Selection Mode

Key Selection Mode	Indication	Operation
identical	**Self Key** is lit	Select Fill and Key source together
coupled	no button lit	Select Fill source and the Coupled Key input as Key source
split	**Key Split** is lit **Key Split** is not pressed	Select Fill source
split	**Key Split** is lit **Key Split** is pressed	Select Key source

3.6.5 Automatic Key Adjustment

3.6.5.1 Auto

The **Auto** button serves to start various automatic functions in the different key modes.

- In **Add Key**, the key control is switched to 1:1 transfer so that key signals e.g. from the caption generator are effective without change.
- In **Luminance Key**, clip and gain are adjusted so that the key source signal is amplified to become a full-range signal with minimum of 0% and maximum of 100%.
- In **Linear Key** clip and gain are set to unity.
- In **Chroma Key**, the **Auto** button starts an automatic key adjustment.

NOTE!
After all automatic key adjustments, the corresponding parameters may still be changed manually.

3.6.5.2 Automatic ChromaKey Adjustment

The first step of setting up most chroma keys is to use Auto Setup. Auto Setup automates the first steps to achieving a chroma key. Auto Setup performs the following:

- Calculates primary suppression Hue and Luminance.
- Sets primary suppression Selectivity and Chroma to defaults.
- Calculates Clip Low, and sets Clip Hi to default.
- Sets all the secondary suppression values to duplicate the primary suppression values, but turns secondary suppression off.
- Changes Opacity temporarily to 100% to permit an accurate backing color sample, and then returns it to its original setting.
- Sets Key Position and Size values to default (0).

Two different Auto Setup algorithms are available, one for well designed and lighted sets (**FGD Fade** off), and the other for more challenging sets (**FGD Fade** on). Depending on individual circumstances, additional manual adjustments may be required after you use Auto Setup.
After an Auto Setup has been initiated by pressing the **Cursor button,** you can cancel it by pressing the **Cursor button** again, but the chroma key will retain the default settings imposed.

If the result of the Auto Setup is not satisfactory, further fine tuning can be made in the chromakey menu.

3.6.5.3 Border On

The border function enables the user to provide the key signals with a border effect which can be adjusted individually.
The border selected in the Keyer menu can be switched on with the **Bord on** button. For further information please refer to the sections Key Menu. The border functionality is not supported in the first software releases.

3.6.6 FGD Fade

If the set is lit unevenly or has other problems, **FGD Fade** is available to help solve the problem. A better alternative, if time permits, is to adjust the lighting on the set to even out the backing color. This may improve the key so that **FGD Fade** is not needed.

3.6.7 Key Prior Button

The **Key Prior** button allows the user to set the next priority stack of the four keyers. To set key priority, hold down the **Key Prior** button and press the **Key 1 – 4** buttons in the keying order desired, from top to bottom priority. This will set the next priority stack. After key priority has been set, select the Key Priority button in the Transition subpanel to use this next priority selection as part of the next key transition.

3.6.8 Key Over

The **Key Over** button changes the actual key priority of the delegated keyer. With each press of the button the priority is advanced by one. When top priority is reached, the next press of the button set the key priority to the lowest level.

3.6.9 Key Invert

The Key Invert button reverses the sense of the key control signal. When Key Invert is active (button lit) black areas of the key cut signal cause replacement of the background, and the white key cut areas cause the background to be retained.

3.6.10 Mask Delegation Buttons

Masks help clean up keys by defining picture areas that are prevented from keying (inhibit mask) or are forced to key (force mask). Separate inhibit and force masks may be set up for each keyer. Masks can be created by pattern generators, or can be based on a video source that has been clip and gain adjusted to create the mask control signal. Masks cannot be applied to preset patterns.

The **Inhibit Mask** and **Force Mask** buttons delegate the keyer to control one of these two mask types. Changes to the masking controls affect only the selected mask type of the keyer delegated in the Keyers subpanel. A high button tally indicates which mask is being controlled. If the other mask is also active, its delegation button will low tally. Masking parameters are controlled in the Keyer Mask Menu.

3.6.11 Key PVW

The **Key PVW** button is used for viewing the key control signal. This button does not affect the output of the M/E. Pressing the button once shows on the preview output the key signal in front of the background. Pressing the button second time shows the key signal.

3.6.12 Freeze Fill Button

The Freeze Fill Button is used to freeze the selected fill signal as a full frame freeze.

3.6.13 Freeze Key Button

The Freeze Key Button is used to freeze the selected key signal as a full frame freeze.
.

3.6.14 DPM Button

The DPM button allows the routing of the keyer's Digital Picture Manipulator into the signal path of the keyer.

3.7 Positioner Subpanel

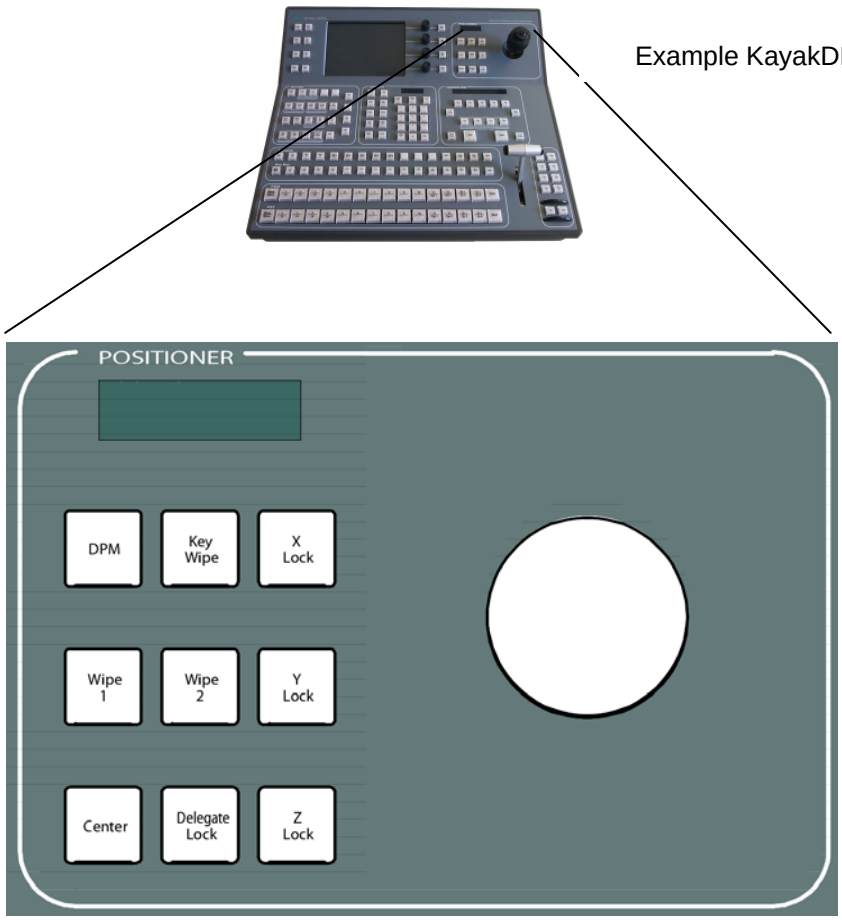


Figure 52 Subpanel Positioner

The Positioner Subpanel is used to control Positioner functions of the Digital Picture Manipulator image and wipe pattern placement, size, angle, and other attributes in conjunction with the menus for the Digital Picture Manipulator.
The Positioner is particularly suitable for adjusting position and rotation parameters and can also be used to select a color from an image (for example, chromakey backing color) using an on-screen cursor.

Operating the Positioner subpanel involves delegating a resource and a set of associated parameters to the Positioner. The Positioner then provides control of the delegated parameter values.

3.7.1 Positioner

The Kayak system Positioner is a precision three-axis device. Moving the Positioner towards or away from you controls the Y-axis, moving the Joystick left and right controls the X-axis, and rotating the Joystick controls the Z axis.

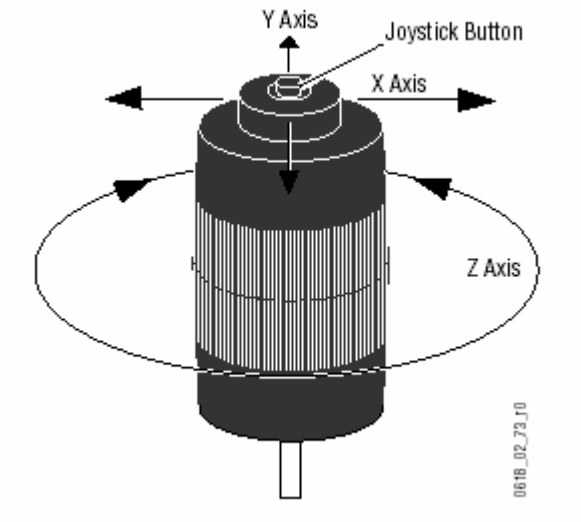


Figure 53 Positioner

3.7.2 Positioner Button

The Positioner button on the top of the Joystick can be used to accelerate the change of the delegated parameter, to allow quicker placement on the screen. The Positioner button is also used to pick a backing color when auto setting up a chromakey.

3.7.3 Positioner Delegation

Because the Positioner is used for many different functions, multiple stages of delegation can be required to access and control a specific set of parameters.

There are two ways of delegation:

- **Delegation by Menu:** A selection in the menu delegates the according digipots parameters to the positioner, if the parameters are suitable to be positioner controlled.

- **Delegation by hardware buttons:** The Positioner Subpanel has 4 main delegation buttons. These buttons are used for delegation in combination with delegation buttons in other subpanels of the switcher.

3.7.3.1 DPM

The DPM button can be combined with the delegation buttons Key1 - 4 in the Keyer Subpanel. To toggle through the different sets of parameters of an according DPM channel (Digital Picture Manipulator), just press the DPM button or the relative Key delegation button several times. Since there are a lot of sets of parameters per DPM channel, it can be more efficient to use the menu delegation to delegate a specific set of parameters.

3.7.3.2 Key Wipe, Wipe1, Wipe2

These **wipe generator** buttons can be combined with the delegation buttons Key1-4 in the Keyer Subpanel and the wipe button in the Transition Subpanel.
There are different location/size parameters per wipe generator for every point of use. E.g. **Wipe1** can be used as background transition color wash control for the background wipe border pattern key inhibit or force mask color wash control for the keyer matte.
If you combine a **wipe generator** button with one of the other delegation buttons, the system checks whether there is a point of use for the according **wipe generator**. In this case the according set of parameters is delegated to the Positioner.

Pressing the Keyer delegation button (or the wipe transition button) repeatedly toggles through the different points of use of the **wipe generator** for the selected delegation.
Pressing the **wipe generator** button repeatedly toggles through all points of use of the delegated **wipe generator**.

Pressing down more than one delegation button at the same time delegates the Positioner to control multiple objects simultaneously.

The display in the Positioner Subpanel always shows delegated set of parameters and the point of use.

The Auto Delegation Function can be disabled by the Delegate Lock button.

3.7.4 Axis Lock Buttons

Activating the **X**, **Y**, and **Z** axis lock buttons individually or in any combination locks parameter changes for the selected axes. For example, if the **X** button is active while the Positioner is moved, then only Y and Z axis deflection can be performed. Axis locking also applies to centering functions.
The **Center** button is used to apply the default (center) value to the delegated parameter.

3.8 Effects Subpanel

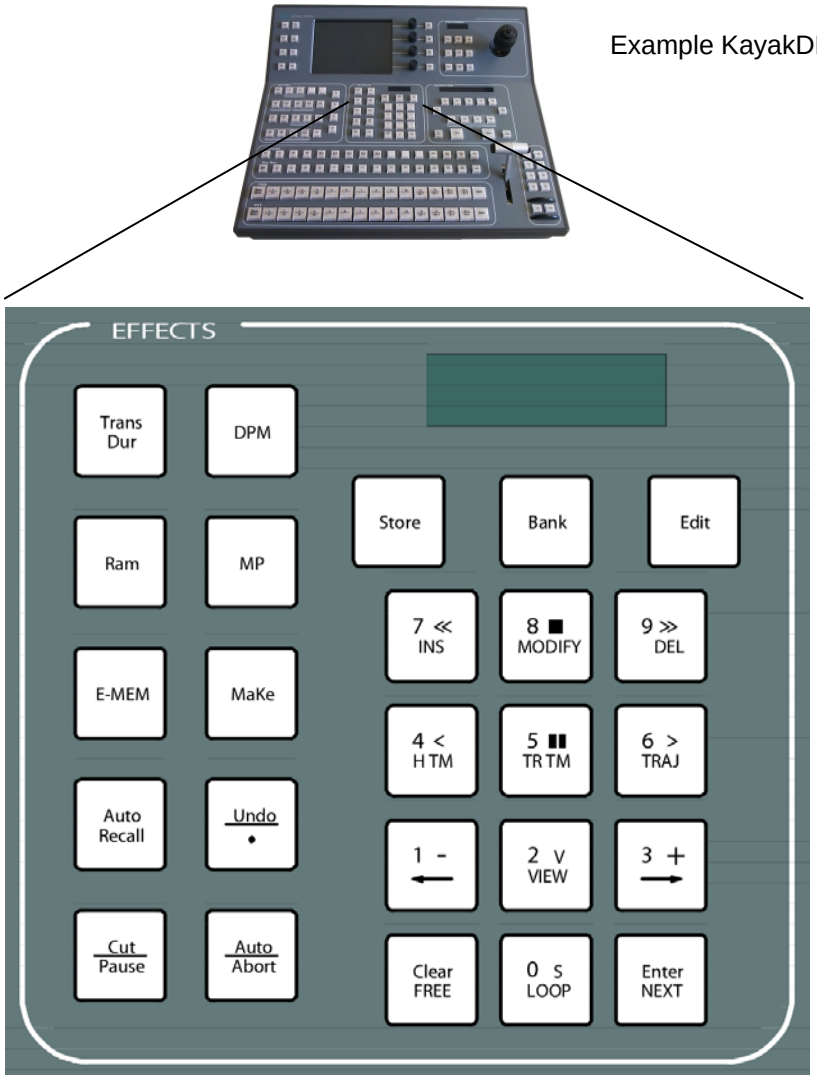


Figure 54 Subpanel Effects

The Effects Subpanel is a multi purpose section of the control panel.

The **Trans Dur** button is a special button, which is also used in the **Transition Subpanel** to set the transition rates for keyer and background transitions. Hold down the **Trans Dur** button and press the **Auto** button or the **Key1 Mix – Key4** Mix buttons to set the selected transition rates. Enter the time with the keypad and confirm the entry by pressing the **Enter** button.

To perform the different tasks, the Effects Subpanel has 5 **Delegation** buttons:

- **DPM** store, edit, recall DPM effects
- **Ram** store, recall RAM Recorder stills, play RAM Recorder clips
- **MP** external machine control
- **E-MEM** store, edit, recall E-MEM registers
- **MaKe** record, play macros

On the following pages the different modes are described in detail.

3.8.1 DPM

In DPM Mode the Effects Subpanel serves for recalling and editing DPM effects. For general information on the DPM structure in the KayakDD system please refer to chapter 5.11

3.8.1.1 Recalling a Register

Effects can be recalled in two different modes: Register Mode and Bank Mode

REGISTER MODE is an input mode for the register number in the Effects subpanel, in which the number is entered in one digit (0 ... 9) or in two digits (10 ... 99) followed by the **Cut** button. **Do not** use the **Enter** button for confirmation!

BANK MODE is an input mode for the register number in the Effects subpanel. The bank number 0 ... 9 corresponds to the tens digit of the register number. When the units digit of the register number is entered, the corresponding effect is recalled immediately.

To run an effect in either mode, just press the **Cut** button.

NOTE!
In register mode the first press of the Cut button (after you have entered the digits) recalls the effect. The next press of the Cut button runs the effect. While the effect is running, consecutive pressing of the Cut button toggle between Pause and Play.

For more detailed run controls please use the menu.

3.8.1.2 Enabling and Disabling Bank Mode

The Bank mode in the DPM panel permits access to a stored effect with a single key (hotkey). The bank number is the tens digit of the register. The hotkeys are the units digits of the register. The Bank mode may be enabled during storing but this does not have any particular benefit.

3.8.1.3 Enabling Bank Mode

Hold the **Bank** key down and select the desired bank with the numeric keypad. The **Bank** key lights up. In the display a "**B**" appears before the register number. While you are in Bank mode you can change the current bank in the same way.

Example:

3.8.1.4 Disabling Bank Mode

Press the lighting **Bank** key.

3.8.1.5 Display

If no editing function or store function is selected, the "**??**" digit display of the subpanel may show the following indications:

No register is selected. The register is empty.

Register 24 is selected. The register is empty.

Register 24 is selected in Bank mode 2 (This corresponds to register 24).
Register 24 is empty.

Register 5 is selected. The register contains a effect and has no particular name.

As above but Bank mode 0 with hotkey 5.

Register 5 is selected. The register contains a effect with the name ABCDEFGH.
The name can only be entered in the menu.

As above but Bank mode 0 with hotkey 5.

3.8.1.6 Selecting a Register for Storing / Editing

When you press the **Store** or the **Edit** button, the current register is prompted in the display. If you want to use this register just press the **Enter** button for confirmation or select first another register by entering a one- or two-digit number with the numeric keypad. Errors can be deleted with **Clear**.

If you wish to select the next free register, press the **FREE** button.

Edit
Select the register as the current one.

Store
Select the register as the current one, clear the register and insert one keyframe with the current state of the enabled Digital Picture Manipulators.

During edit mode the digit buttons of the numeric keypad have the following functions:

0: no function
1: **Go to previous Keyframe**
2: no function
3: **Go to next Keyframe**
4: **Play Reverse**
5: **Pause**
6: **Play**
7: **Insert After**
8: **Modify Keyframe**
9: **Delete Keyframe**

To leave the edit mode just press the Edit button again. You are now prompted to press **Enter** for saving the changes or **Clear** for discard the changes.

3.8.1.7 Deleting a Register

1. Press **Clear**.
2. Select other register (0 ... 99). Only if not already displayed.
3. Press **Enter**

The buttons Auto Recall, Undo, Auto/Abort do not have a function in DPM mode

3.8.2 Ram

In Ram Mode the Effects Subpanel serves to control the internal RAM Recorders.

To select the desired RAM Recorder channel for control, either toggle through the channels by repeatedly pressing the Ram button, or hold down the Ram button and select the according channel number.

Since the frames of a channel can be looked at as moving video or as independent stills, the Bank button is used to toggle between Clip and Stillstore Mode.

The display shows the channel number, and -depending on the mode - status and the timecode or the number of the still.

When the Bank button is lit, Clip Mode is selected.

In Clip Mode each digit button in the keypad represent a tape motion command. The according command is indicated by a character or a graphical symbol on the respective numeric keypad.

3.8.2.1 Button Functions

7 << rewind

8 # stop, shows the input signal of the channel

9 >> fast forward

4 < reverse play

5 || still

6 > play

1 - single step back (when the channel is in still)
decrease variable speed (when the channel is in variable speed)
decrease shuttle speed (when the channel is in shuttle mode)

2 V variable speed

3 + single step forward (when the channel is in still)
increase variable speed (when the channel is in variable speed)
increase shuttle speed (when the channel is in shuttle mode)

0 S shuttle mode

The record command is accomplished by holding down the **Store** button and pressing the digit button **6 >** .

The **Edit** button allows you to enter a timecode for the GOTO Timecode command. You can enter the timecode, using the **Undo/.** button as delimiter. The timecode entry has to be confirmed be the **Enter** button.

Auto Recall No functionality in **Clip Mode**
Cut/Pause
Auto/Abort
Clear/Free

When the **Bank** button is off, **Stillstore Mode** is selected.

3.8.2.2 Storing a Still

- Press the store button
- Select a number
- Press the Enter button to confirm

3.8.2.3 Recalling a Still

- Select a number
- Press the Cut button to recall the still

3.8.2.4 Deleting a Still

- Press the Clear button
- Select a number
- Press the Enter button to confirm

3.8.2.5 Hint

Auto Recall	No functionality in Ram Mode.
Undo	
Auto/Abort	

3.8.3 MP (Media Player)

In **MP Mode** the Effects Subpanel serves for controlling external machines. This can be any type of device, which can be controlled by one of the machine control protocols, like video/audio tape machines, hard disk recorders, etc.

To select the desired machine for control, either toggle through the available machines by repeatedly pressing the MP button, or hold down the MP button and select the desired machine number.

The display shows the machine number, status and the timecode.

In **MP Mode** each digit button in the keypad represent a tape motion command. The command is indicated by a character or a graphical symbol on the numeric keypad.

3.8.3.1 Button Functions

7 << rewind

8 # stop, shows E-to-E image, depending on machine setup

9 >> fast forward

4 < reverse play

5 || still

6 > play

1 - single step back (when machine is in still)
decrease variable speed (when machine is in variable speed)
decrease shuttle speed (when machine is in shuttle mode)

2 V variable speed

3 + single step forward (when machine is in still)
increase variable speed (when machine is in variable speed)
increase shuttle speed (when machine is in shuttle mode)

0 S shuttle mode

The record command is accomplished by holding down the **Store** button and pressing the digit button **6 >**.

The **Edit** button allows you to enter a timecode for the GOTO Timecode command. You can enter the timecode, using the **Undo/.** button as delimiter. The timecode entry has to be confirmed be the **Enter** button.

3.8.3.2 Hint

Bank	No functionality in MP Mode.
Auto Recall	
Cut/Pause	
Auto/Abort	

3.9 E-MEM

In E-MEM mode the Effects subpanel serves for storing and recalling switcher statuses and processes.

E-MEM thus permits storing and recalling individually prepared operating statuses and timelines with different background, key sources, borders, wipe pattern positioning, coloring etc.

The memo system is used for storing and recalling static settings (statuses, snapshots) and interpolated timelines.

The snapshots and timelines are identified with numbers (Register 0 ... 99).

E-MEM can be operated in two ways:

- operation via the buttons of the Effects panel section
- operation via the menu (not implemented in current software release version)

The number of keyframes in a timeline is only limited by the storage capacity of the respective switcher computer and the number of mixing levels and storable functions. The operator can edit a timeline in order to produce more sophisticated effects.

3.9.1 Definition of Terms

SNAPSHOT (SNAP)	is a switcher status or the status of a switcher part.
KEYFRAME (KF)	is a static switcher status within one timeline.
TIMELINE (TIML)	is a stored sequence of switcher statuses (keyframes).
DISSOLVE	is a dissolve between static switcher statuses. The analogue values are dissolved, the switching functions are switched at the end of the dissolve procedure.
DISSOLVE TIME	is the time for dissolving between two static switcher statuses.
STORE	is the storing of a static switcher status.
RECALL	is the reproduction of a stored static switcher status.
EDITING (EDIT)	is the creation or the processing of a timeline outside real-time.
PLAY	is the play of a stored timeline.
TRAJECTORY	is the ”trajectory” between keyframes.
REGISTER	is a memory location where a snapshot or a timeline can be stored. Registers are identified with a number between 0 ... 99.
REGISTER MODE	is an input mode for the register number in the Effects subpanel, in which the number is entered in one digit (0 ... 9) or in two digits (10 ... 99) followed by functional selections such as **Enter**, **Cut** or **Auto**.
BANK MODE	is an input mode for the register number in the Effects subpanel. The bank number 0 ... 9 corresponds to the tens digit of the register number. When the units digit of the register number is entered, the corresponding snapshot or timeline is triggered immediately.

The **Store**, **Bank** and **Edit** buttons have different functions in the various operations.
The secondary lettering of the buttons **0 ... 9** applies when existing timelines are modified. The secondary lettering **FREE** of the **Clear** button applies when a register is selected. The secondary lettering **NEXT** of the **Enter** button applies when an assigned register is called.
In the following instructions only the applicable function of the double lettering is mentioned.

3.9.2 Display

If no editing function or store function is selected, the "**??**" digit display of the subpanel may show the following indications:

REG	????			No register is selected..
REG	24			Register 24 is selected.
REG	B24			Register 24 is selected in Bank Mode 2. This corresponds to register 24. Register 24 is empty
SNAP	05	SN05	- - - -	Register 05 is selected. The register contains a snapshot and has no particular name.
SNAP	B05	SN05	EFGH	As above but in Bank Mode 0 with hotkey 5
SNAP	05	ABCD	EFGH	Register 05 is selected. The register contains a snapshot with the name "ABCDEFGH". The name can only be entered in the menu!
SNAP	B05	ABCD	EFGH	As above but in Bank Mode 0 with hotkey 5
TL	16	TL16	- - - -	Register 16 is selected. The register contains a timeline and has no particular name.
TL	B165	TL16	- - - -	As above but in Bank Mode 1 with hotkey 6
TL	16	KLMN	OPQR	Register 16 is selected. The register contains a timeline with the name "KLMNOPQR". The name can only be entered in the menu!
TL	B16	KLMN	OPQR	As above but in Bank Mode 1 with hotkey 6

3.9.3 Enabling and Disabling Bank Mode

The Bank mode in the E-MEM panel permits access to a stored snapshot or timeline with a single button (hotkey). The bank number is the tens digit of the register. The hotkeys are the units digits of the register. The Bank mode may be enabled during storing but this does not have any particular benefit.

3.9.3.1 Enabling Bank Mode

Hold the **Bank** key down and select the desired bank with the numeric keypad. The **Bank** key lights up. In the display a "**B**" appears before the register number.

Example:

SNAP	B05	SN05	- - - -

3.9.3.2 Disabling Bank Mode

Press the lighting **Bank** button.

3.9.4 Selecting a Register During Storing

During the storing of snapshots or timelines the register to be used for storage must be selected. The procedure is the same for both cases.

However, the indication in the display differs

- for Snapshots **STOR**
- for Timelines **EDIT**

If the register number is to be taken over that was shown before the actuation of the **Store** or **Edit** button, no further selection is necessary.

NOTE!
During storing the contents of the register is overwritten!

If you wish to select the next free register, press the **FREE** button.

If you wish to select a particular register, enter a one- or two-digit number with the numeric keypad. Errors can be deleted with **Clear**.

NOTE!
Should the register be assigned, the contents is overwritten when storing.

3.9.5 Selecting a Register During Recalling

When a snapshot or a timeline is recalled, there are several ways to select a corresponding register.

If the register shown in the display is to be used, no further selection is necessary.

To select the next used register, press the **NEXT** button.

To select a particular register, enter a one- or two-digit number with the numeric keypad. If a two-digit number is entered (e.g. 15), the related register (1) appears in the display when the first digit (1) has been entered. The desired register (15) appears after the input of the second digit.

The input of the figures *need not* be confirmed with **Enter**.

3.9.6 Storing a Snapshot

1. Set the switcher in the desired operation mode.
2. Set **Define memo**
3. Press **Store**
4. Select register with numeric key pad.
5. Press **Enter**

3.9.7 Deleting Snapshots and Timelines

4. Press **Clear**.
5. Select other register (0 ... 99). Only if not already displayed.
6. 3. Press **Enter**

3.9.8 Dissolve Functions Depending on Snapshot or Timeline Preselection

Button	Snapshot preselected	Timeline preselected
Auto	Dissolve to the snapshot in the time set with **Trans dur**.	Playing the timeline in the time set with **Trans dur**.
Cut or Hotkey in Bank mode	Recall the snapshot	Playing the timeline in the stored time.

NOTE!
*Timelines that contain an endless loop or that are waiting for an event (GPI, Time) can only be recalled with **Cut**.*

3.9.9 Other Button Functions

3.9.9.1 Trans Dur

Entry of the Auto transition duration.

- Hold down the **Trans dur** button and press the **E-MEM** button.
- Enter transition duration with numeric keypad.
- The time is indicated in the **FRAMES** display.
- Complete the entry with **Enter** or **Trans dur** again.

3.9.9.2 Auto Recall

When Auto Recall is active, the recall of a snapshot or timeline will restore the Define Memo in the same state, which was active when the register was stored.

3.9.9.3 Undo

If you press this key, the status before the last recall of a snapshot or a timeline can be restored even if several other operations have been performed in the meantime.

3.9.9.4 Cut / Pause

Function of the button:

- If the E-MEM is not playing a timeline and a snapshot register is selected, **Cut** recalls the snapshot.
- If the E-MEM is not playing a timeline and a timeline register is selected, **Cut** starts playing the timeline.
- If the E-MEM is playing a timeline, **Cut** pauses playing the timeline; another **Cut** continues playing the timeline.
- If the E-MEM is playing a timeline and the timeline is waiting, **Cut** continues playing the timeline.

3.9.9.5 Auto / Abort

Function of the button:

- If the E-MEM is not playing a timeline and a snapshot register is selected, **Auto** interpolates to the snapshot in a fixed period of time (Set by Trans Dur).
- If the E-MEM is not playing a timeline and a timeline register is selected, **Auto** starts playing the timeline in a fixed period of time. This only works if the timeline has no endless loops or waits and a transition duration other than 0 has been selected.
- If the E-MEM is playing a timeline, **Auto** aborts playing the timeline. A timeline played with **Auto** can’t be stopped/continued with **Cut**.

3.9.10 Timeline Editing

3.9.10.1 Components of a Timeline

A timeline is stored as a chain of keyframes with related transitions between the keyframes and other timeline objects (e.g. waits, triggers).

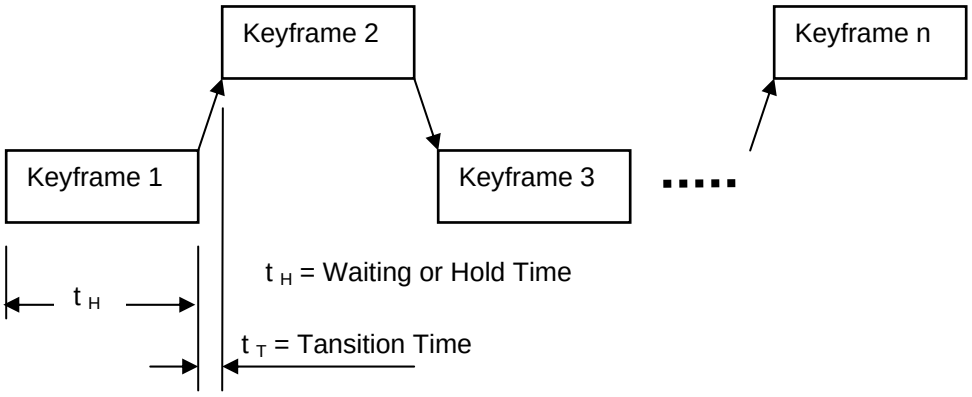


Figure 55 Components of Timeline

The dissolve between the keyframes is set to linear for default.

In the display of the Effects subpanel the following components of a timeline can be displayed:

Start	Timeline start symbol
End	Timeline end symbol
Kfnnn	Internal stored keyframe
SNnn	Ext. stored keyframe, snapshot in register nn
TLnn	Ext. stored timeline, timeline in register nn
Loop	Loop begin symbol
ELoop	Loop end symbol
User	Wait for a user input
Hold	Wait for a number of frames

TOD	Wait for a special time of day
TC	Wait for a special timecode of a conn. machine
MaKnn	Trigger MaKE Memo nn of the panel where the timeline was stated
GPIn	Wait for GPI n
GPOn	Wait for GPO n
EGPOn	Trigger external GPO n
PGPIn	Wait for panel GPI n
PGPOn	Trigger panel GPO n
TGPIn	Trigger GPI n
Stop	TMC stop
Play	TMC play
Rec	TMC record
Var	TMV variable
Frew	TMC fast rewind
Ffwd	TMC fast forward
Cue	TMC cue to specified timecode
CueIn	TMC cue to in point
CueOut	TMC cue to out point
Jog	TMC joggle
Step	TMC step

Due to a limited number of buttons only some of the objects described above can be inserted and edited by the Effects subpanel. For full timeline edit control please use the Sidepanel program.

3.9.10.2 Generating a Timeline

To generate a timeline the following steps must be done:

- Ensure that no transition or anything else is running at the E-MEM
- Press **EDIT**
- Select register
- Press **ENTER**
- Insert timeline objects (keyframes, loops,...)
- Press **EDIT**
- The timeline is stored as a chain of keyframes, snapshots, loops, ... with related dissolves (transitions) between the keyframes.

3.9.10.3 Modifying a Timeline

The following procedure is used for all modifications of a timeline:

- Ensure that no transition or anything else is running at the E-MEM
- Press **EDIT**
- Select Register
- Press **ENTER**
- Insert, delete, modify,... timeline objects (keyframes, loops,...)
- Press **EDIT**
- The timeline is stored as a chain of keyframes, snapshots, loops, ... with related dissolves (transitions) between the keyframes.

NOTE!
Modifications of an existing timeline always relate to the last timeline object indicated in the display.

3.9.10.4 Functionality of the Buttons in the Edit Mode

NOTE!
Modifications of an existing timeline always relate to the last timeline object indicated in the display. This object is the currently selected timeline object.

Store
Inserts a keyframe (with the related transition) in the timeline.

Bank
No functionality during EDIT.

Edit
Ends the timeline editing, the timeline will be stored.

7 / INS
Inserts a keyframe (with the related transition) in the timeline.

8 / MOD
The functionality depends on the type of the currently selected timeline object.
KF The selected keyframe is changed to the current state of the switcher.

- **LOOP** Change of the loop counter (000 = endless loop).
- **ELOOP** Change of the loop counter (000 = endless loop).

9 / DEL
Deletes the currently selected timeline object. Depending on the type of the timeline object there are the following relationships.

- **LOOP** The related ELOOP object will also be deleted.
- **ELOOP** The related LOOP object will also be deleted.

4 / HTM
Changes the hold time of the selected snapshot or keyframe. The default hold time is always 0 frames.

5 / TRTM
Changes the transition time of the selected keyframe object. The default transition time is set to the current transition duration of snapshot dissolves.

6 / TRAJ
Changes the trajectory of the selected transition object. Possible are **Linear**, **S-Linear**, **Curve**, **S-Linear to Pause**, and **Curve to Pause**.

Undo
The Undo function is enabled in the Edit mode and serves the abortion of a running edit operation without changing in the timeline. If, for instance, the button **Undo** is pressed in the edit mode, an Undo dialog is displayed:

- Press **Undo** again return to the edit mode
- Press **Enter** abortion of edit mode without saving

1 / ←
The button permits a successive selection of the individual objects of a timeline. Changes the cursor position to the previous object.

2 / VIEW
With the **VIEW** function enabled (button lights up) the switcher is switched to the status stored in the keyframe.

3 / →
The button permits a successive selection of the individual objects of a timeline. Changes the cursor position to the next (following) object.

Cut
No functionality during EDIT.

Clear / FREE
The button **Clear/FREE** enables to jump to the begin of a timeline.

0 / LOOP
If the currently selected object is not inside of a loop (button **LOOP** is off) a loop object will be inserted before the currently selected object. The related ELOOP object is inserted before the next LOOP or ELOOP object or at the end of the timeline. The cursor will be set to the ELOOP object. If the currently selected object is inside of a loop, the ELOOP object is moved to the current cursor position.

Enter / NEXT
The button **Enter/NEXT** enables to jump to the end of a timeline. While changing times etc. it serves always for confirmation.

Auto
No functionality during EDIT.

3.9.10.5 Changing the Hold Time of a Snapshot or Keyframe

The following procedure is used:

- Select Keyframe / Snapshot (button ← and →)
- Press HTM
- Enter hold time with numeric keypad
- Press Enter

NOTE!
Errors can be deleted with Clear.

3.9.10.6 Changing the Transition Time of a Snapshot or Keyframe

The following procedure is used:

- Select transition object
- Press TRTM
- Enter transition time with numeric keypad
- Press Enter

NOTE!
Errors can be deleted with Clear.

3.9.10.7 Inserting a Loop in a Timeline

If a loop is inserted in the Effects subpanel always an endless loop (loop counter = 000) is inserted for default. To change the loop counter follow
the steps under section Modifying A Loop.

NOTE!
It's possible to insert loops (max. 99) into other loops. This functionality is only available with the menu operation.

3.9.10.8 Entering a Loop During the Generation of a Timeline

The following procedure is used:

- Enter last timeline object before the loop
- Press LOOP
- Enter first timeline object in the loop

NOTE!
The loop end is before the next ELOOP or LOOP object or the end of the timeline if no other loop follows. If the button LOOP is pressed before the end of the loop, the

ELOOP object is moved to that position in the timeline. If the loop is an endless loop, the timeline ends with the end of the loop.

3.9.10.9 Inserting a Loop in an Existing Timeline

The following procedure is used:

- Select the timeline object after which the loop should start, or select transition before which the loop should start.
- Press LOOP

NOTE!
The loop end is before the next ELOOP or LOOP object or the end of the timeline if no other loop follows. If the button LOOP is pressed before the end of the loop, the ELOOP object is moved to that position in the timeline. If the loop is an endless loop, the timeline ends with the end of the loop.

3.9.10.10 Modifying a Loop in an Existing Timeline

The following procedure is used:

- Shift LOOP or ELOOP indication at the end of the display (button ← and →)
- Press MOD
- Enter the loop counter with the numeric keypad
- Press Enter

NOTE!
Errors can be deleted with Clear. If the loop counter is 000 the loop is an endless loop.

3.9.10.11 Delete a Loop in an Existing Timeline

The following procedure is used:

- Shift LOOP or ELOOP indication at the end of the display (button ← and →)
- Press DEL

NOTE!
The related end or the begin of the loop is also deleted.

3.9.10.12 Delete a Timeline object in an Existing Timeline

The following procedure is used:

- Shift the timeline object to delete at the end of the display (button ← and →)
- Press DEL

3.10 MaKe

In MaKe mode the Effects Subpanel serves for recording and playing Panel Macros. The total number of registers available for macros is 96.

3.10.1 Selecting a Register for Record Start

For record start of a macro the register to be used for storage must be selected.

Press the **Store** button.
The display prompts **RECORD**

- If the register number is to be taken over that was shown before the actuation of the **Store** button, no further selection is necessary.

NOTE!
During recording the contents of the register is overwritten!

- If you wish to select the next free register, press the **FREE** button.

- If you wish to select a particular register, enter a one- or two-digit number with the numeric keypad. Errors can be deleted with **Clear**.

NOTE!
Should the register be assigned, the contents is overwritten with the start of the recording

Confirm the register selection by pressing the **Enter** button.
Now the recording of the macro starts, while the **Store** button starts blinking. All keystrokes executed on the panel and in the menu, which generate a command to the mainframe are recorded. Pressing the blinking Store button again stops the recording.

NOTE!
*When you execute any macro action in the **Miscellaneous Bus Section**, the recording is stopped automatically. Changing the delegation of the Effects Subpanel to e.g. E-MEM does **not** stop the recording. This allows you to include E-MEM recalls and machine control commands into the macro.*

NOTE!
Recorded macros are named by default as MK01 – MK96. Renaming is only possible via the Sidepanel program.

3.10.2 Recalling a Macro

For recalling a macro there are two basic ways to select a corresponding register.

3.10.2.1 Register Mode

If the register shown in the display is to be used, no further selection is necessary.

- To select the next used register, press the **NEXT** key.
- To select a particular register, enter a one- or two-digit number with the numeric keypad. If a two-digit number is entered (e.g. 15), the related register (1) appears in the display when the first digit (1) has been entered. The desired register (15) appears after the input of the second digit.

After the selection press the **Cut** button to play the macro.

3.10.2.2 Bank Mode

In Bank mode registers are treated in groups of ten. Such a group is called a bank. The display below shows register 7 of bank 4. This is equivalent to register 47 in **Register Mode**. Each digit button in the keypad is now a hotkey. Pressing digit button 3 will directly recall macro 43. To select another bank, hold down the Bank button and press one of the digit buttons, e.g. pressing digit button 2 would switch to bank 2, giving direct access to the macros 20 through 29.

Example:

In **Bank Mode** the **NEXT** button advances to the next used register in the bank, but in contrary to **Register Mode** the macro is directly recalled. This allows you to recall a stack of up to ten macros by repeatedly pressing the same button.

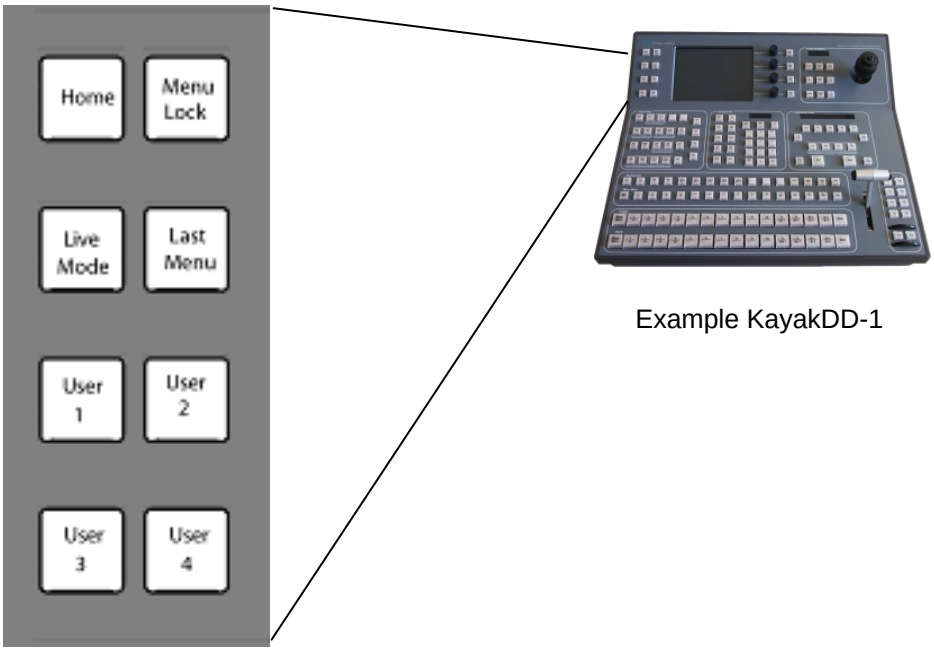
The Bank mode may be enabled during recording but this does not have any particular benefit.

Pressing the Bank button toggles between Register Mode and Bank Mode.

While the **Miscellaneous Bus Section** allows you only to address the first macros 16, the Make delegation of the Effects Subpanel gives you full access to all 96 macros.

NOTE!
Buttons Edit, Auto Recall, Undo, Auto/Abor: No functionality in Make Mode.

3.11 Menu Subpanel



Example KayakDD-1

Figure 56 Components of Timeline

The Menu subpanel allows easy navigation in the menu display

3.11.1 Home

Brings you to the top menu, allowing further navigation.

3.11.2 Menu Lock

Locks the menu to the actual screen. No further auto delegation is performed.

3.11.3 Live Mode

Reduces the number of parameter adjustments to the most essential ones, allowing faster control with less selection steps.

3.11.4 Last Menu

Brings you back to the last menu, allowing to toggle between 2 Menus with one keystroke.

3.11.5 User1 – User4

User definable preferred menus. Select a menu, hold down the UserX button for two seconds. A short flash of the button confirms that this menu is learned. To recall the menu, just press the UserX button again.

4 Menus Overview

4.1 Introduction

The KayakDD Menu panel provides capabilities that complement the operation of the Main panel. The Menu panel controls most system functions, and has additional controls not available on the Main panel (for example, wipe pattern selection, chroma key manual controls, and configuration menus). During live production the operator spends most of his time working directly on the Main panel. The Menu panel is used extensively for setup and effects creation.

A second way of full control is the **Sidepanel program**
Sidepanel program can run on a computer with operating system Windows95 or higher.

4.1.1 Menu Panel Description

The Menu panel has a touch screen display and four soft knobs on the right

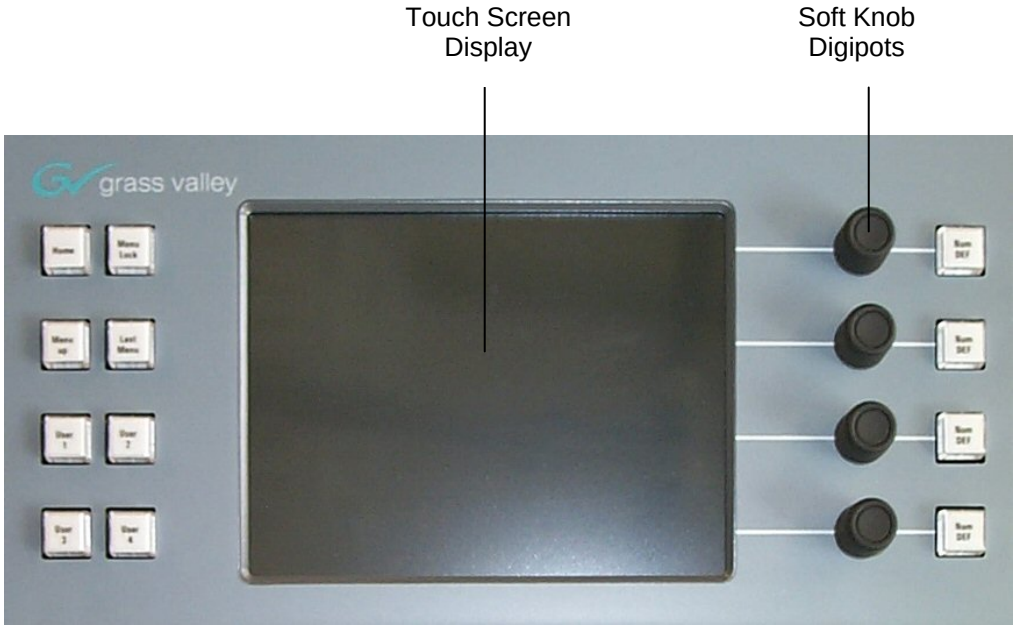


Figure 57 Touch Screen Display

4.1.2 Touch Screen

CAUTION !
Do not apply any sharp or rigid object (no pens or pencils) to the touch screen display surface. The Menu panel touch screen allows direct interaction with menu controls displayed on the screen. The screen is designed to work with a finger or other soft object. The touch screen is sensitive to a single pressure location only, so only one touch surface control can be adjusted at a time.

4.1.3 Soft Knobs (Digipots)

Knobs along the right side of the Menu panel can be used to dial in parameter values for functions displayed on the touch screen. When a knob is active, the touch screen displays the parameter name and its current value on a data pad. The parameter can be adjusted by turning the knob, or the data pad can be touched to bring up a numeric keypad. On some menus, a soft knob may be able to control parameters or scroll a list located elsewhere on the screen. In these cases a line connects the soft knob to the controlled screen area.

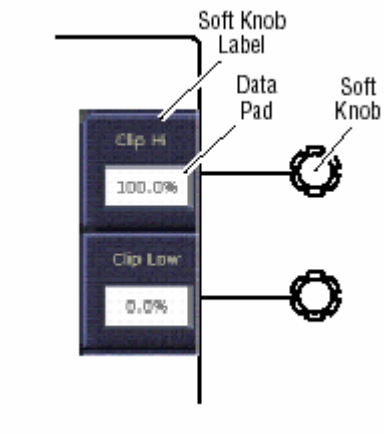


Figure 58 Soft Knobs (Digipots)

4.1.4 Menu Screen Organization and Components

KayakDD system menus are context sensitive. They display different information and provide various types of controls depending on what area of the system is involved. Menus are organized into categories of related controls, which can be directly selected with touch buttons located at the bottom left of the screen. Some configuration menus have additional subcategory selections available at the bottom right of the menu.
Within a menu, delegations may also be available to access specific parameters. In the top corner of many menus you will find a delegation button, allowing to switch e.g. between different keyers for the same type of menu.
A representative menu screen (Keyer-Preset Pattern) is shown below. Buttons with a little triangle at the bottom are popup buttons. When selected, a popup display offers a multiple-choice selection.

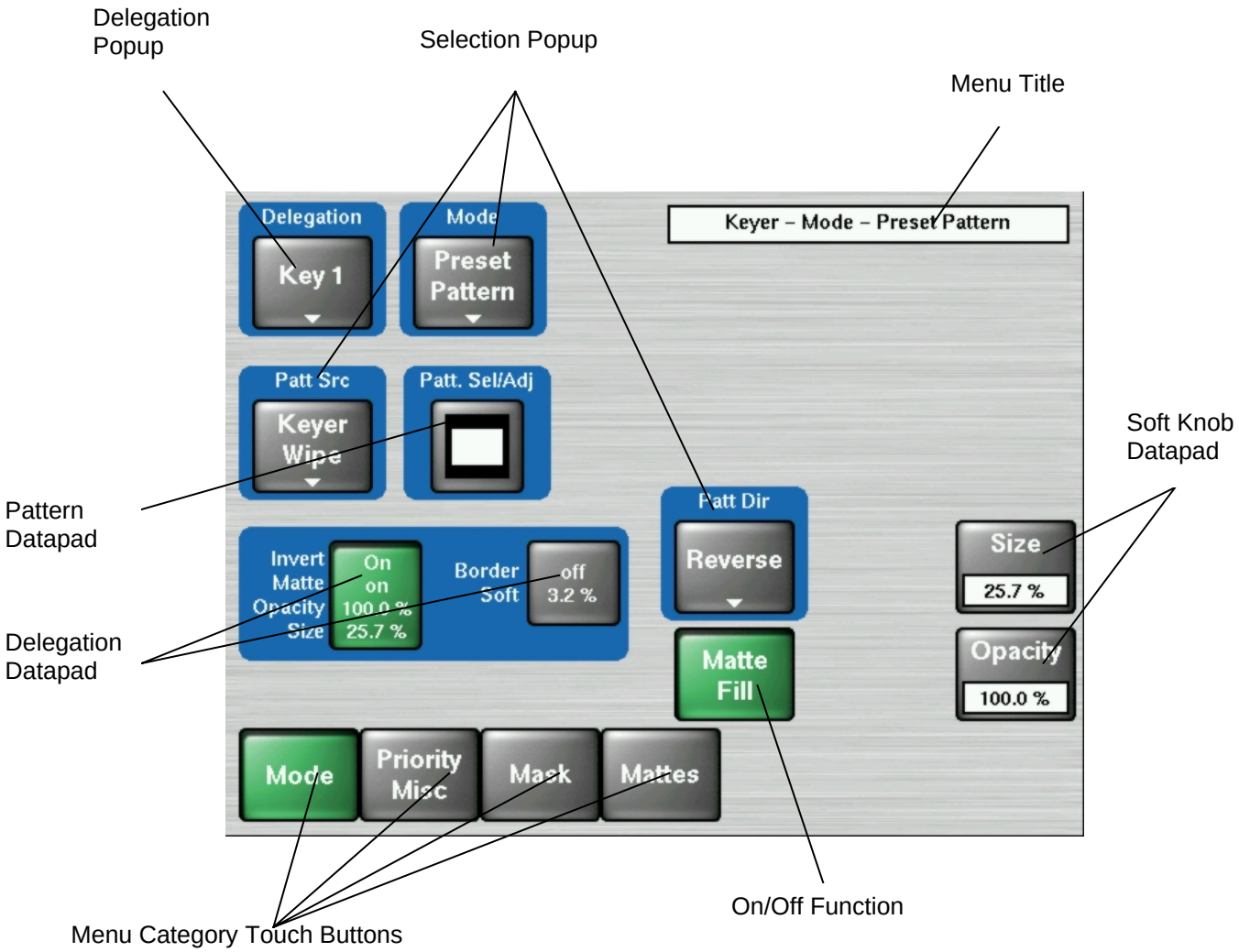


Figure 59 Example Screen Organization and Components

4.1.5 Data Pads and Touch Buttons

The KayakDD system menus make extensive use of data pads. Data pads are active areas on the screen that display a summary of the status of an object, and when touched bring up additional controls and information for that object.
Some data pads display a single value (for example, the soft knob data pads). Touching a soft knob data pad brings up a keypad on the screen for data entry (which can be closed without making any changes if desired). A special pattern data pad also exists, which displays the shape of the current pattern (the Square shape in *Figure 59*). Touching this data pad provides a link to the Wipe.

Note that a single touch of a data pad will not change any KayakDD system settings, but just brings up controls that permit changes. You can surely touch any data pad to explore that object's parameters and settings. Actual changes are enacted on the screen with the touch buttons, by turning a soft knob, or by entering a value on a keypad.
Some menu items that look like data pads only display information, but do not have Rounded corners. Touching these buttons does not generate a popup menu or a menu change.
The information displayed might be able to be changed using different controls, or it may simply report a status.

Touch buttons do not display data, and are labeled by their function. Direct change touch button functions include selecting an operating mode (**Preset Pattern** in *Figure 59*), or turning on an attribute (**Matte Fill** in *Figure 59*). Touching these buttons will immediately activate their function.

Note that the Menu Category touch buttons at the bottom of the screen are used to display a different category of controls, and this is actually a form of delegation. Touching these buttons will not change any actual KayakDD system settings, so they can also be surely touched at anytime to explore the menus.

Touch buttons can control on/off (green/gray) functions (**Matte Fill** in *Figure 59*), or they can select from a group of parameters, and turn green to indicate the state of that parameter. A second way of presenting group selections is the Popup Button (e.g. **Preset Pattern** in *Figure 59*).

4.1.6 Menu Title

The menu title is identical in all the KayakDD system menus. The left portion of the menu title identifies the name of the current menu. The selected subcategory or specific mode is also displayed when appropriate.

4.1.7 Menu Category Selection

Menu category selection touch buttons are arranged along the bottom left of the screen (Mode, Priority, Mask etc. in the example). Touching one of these buttons takes you directly to that category. The currently selected category is shown by the touch button turning green.
Some configuration menus have additional subcategory selections available at the bottom right of the menu. The selected subcategory button is colored green.

4.1.8 Delegation Group

Additional levels of delegation are needed in e.g. the Keyer menu, since it must control all 4 keyers. This highest level of delegation is located on the top left side of the menu. Data pads display limited status for a particular object. Touching a data pad delegates that object, and the rest of the menu will then display information and controls for only that object. The data pad of the selected object is colored green.

4.1.9 Mode Selection

Each keyer has several types of operation, one of which can be chosen with the Mode Selection Popup button. In the Keyer menu, when a particular mode is selected, the Parameter Control area will display information for only that mode of the delegated object.
Different types and numbers of controls can appear, depending on the capabilities of the selected mode.
Generally, touch buttons that are closely related to one another have a blue background, though this is not necessarily an indicator that the buttons are interlocked.

4.1.10 Parameter Control Area

In the Keyer menu example, a Parameter Control area contains function selection touch buttons and soft knob pads for the selected operating mode.
Function selection touch buttons either toggle on and off or are part of an interlocked group. The soft knob pads on the right allow individual parameter adjustments, as described earlier.

4.1.11 Additional Function Buttons

In the Keyer menu, some functions are available for all delegated objects and their modes. Touch buttons for these functions can be located outside the Parameter Control area.

4.1.12 Menu Access Touch Button

In some cases it is handy to jump to a different menu and delegation to adjust related controls. For example, an operator setting up a mask may need to adjust a pattern in the wipe menu. To make menu navigation easier, a menu access button can be included on one menu that links to a different, related menu. For example, the Wipe Select & Adjust functions.

4.1.13 Numeric Keypad

Touching a soft knob pad or other single numeric parameter pad brings up a numeric keypad that can be used to enter exact values.

Figure 60 Numeric Key Pad

4.1.14 Alphanumeric Keypad

Touching the pad for a text parameter brings up an alphanumeric keypad.

Figure 61 Alphanumeric Key Pad

4.1.15 Menu and Panel Interactions

The Main panel and the Menu panel graphical user interface operate as a single control surface, and so these components interact with one another. Many controls on the Main panel are duplicated on the Menu panel screens. For example, a keyer can be set to use a Chroma key with a Main panel button or a Menu touch button. Other controls, like manual Chroma key settings, are only available on the Menu panel.
Double Press Open (DPOP) and Single Press Open (SPOP) are convenient ways to access related menus when working on the Main panel. Double pressing or single pressing certain buttons bring up particular menus.

Once that menu is displayed, delegation changes affecting that menu that are made on the Main panel will be tracked on the Menu panel. For example, if Key 1 is selected on a menu, and then Key 2 is selected on the Main panel, the menu display will change its delegation to Key 2.
However, the reverse is not true. Changing delegations on the Menu panel does not change Main panel delegations.
When both the Main panel and the Menu panel are delegated to the same object (say, Key 1), changes can be made to that object from either panel. Once the change occurs, both panels will be updated to reflect the status of the object.
Both panels do not need to be delegated to the same object to enact a change, however. Suppose the Main panel is delegated to control Key 1 while the Menu panel is delegated to Key 2. Changes made on the Menu panel will affect only Key 2, and changes made on the Main panel will affect only Key 1.
When the delegation of either panel is changed to a new object, that object's current status (which may have been changed since last shown) will be reflected on that panel.

5 Menu Summaries

In the remainder of this chapter, figures of several KayakDD system menus are presented to familiarize you with various screen layouts. Cross references are provided for more detailed information. Because each menu controls different aspects of the KayakDD system, the screen parameters and organization will vary, but the basic principles previously described are followed.

In general, to learn menu capabilities you can touch the screen where you think more information may be available (data pads and subcategory touch buttons). The actual video output of the system will not change unless a specific parameter button is touched, a value is changed with a soft knob, or a new value is entered with a popup keypad.

At system start the KayakDD will bring up the **Home men**u. You can always reach this menu by pressing the **Home** button in the top left of the control panel.

5.1 Home Menu

The Home menu is used to access the KayakDD system menus. Touch the button of the desired menu type to go directly to that menu. If multiple menus are available for that type, the last selected menu will be displayed.

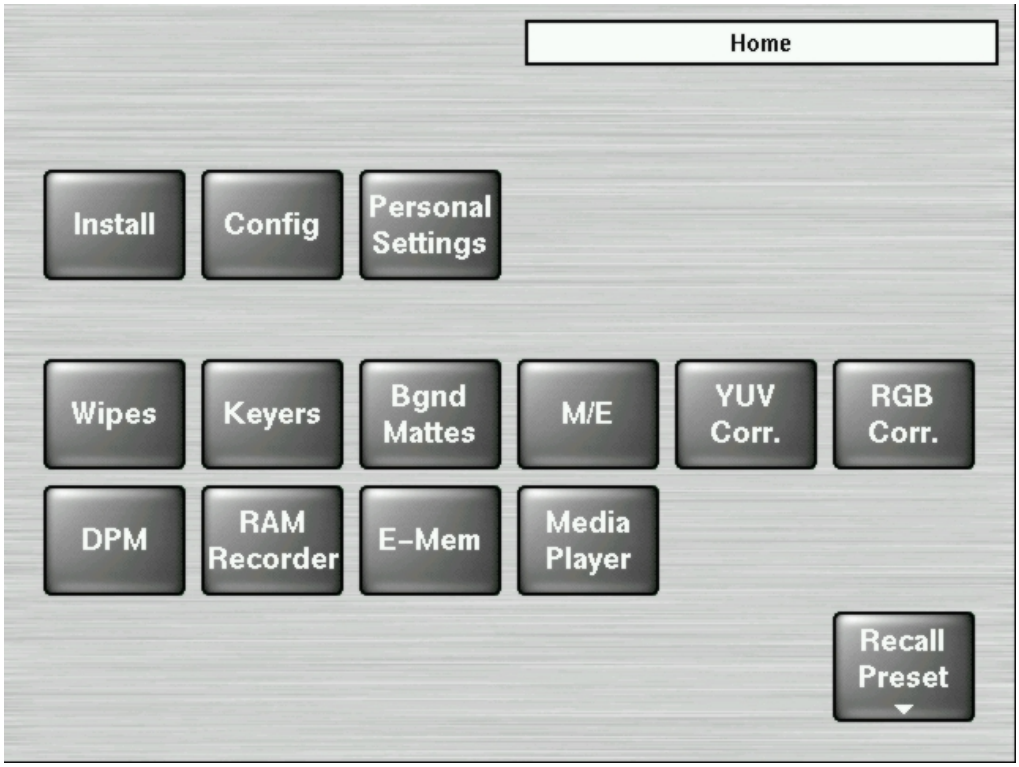


Figure 62 Home Menu

When controlling Kayak menu via mouse on PS/2 connector, a 'right mouse click' can be used to return to the Home menu.

5.1.1 Home Menu Buttons

Some buttons on the Main control panel will open a specific menu automatically when pressed. For example, selecting the **Wipe** button in the Transition subpanel will open the Wipe menu.

The Home menu is used to navigate manually to the desired menu.

5.1.1.1 Install

System setups, most of them are only setups during installation. Some more advanced system functions are not yet supported by the menu. If you want to set these functions now, we advice to run the Sidepanel application on a separate personal computer.

5.1.1.2 Config

Configuration setups, these setups are part of an application. Some more advanced configuration functions like storing and loading applications are not yet supported by the menu. If you want to use these functions now, we advise you to run the Sidepanel application on a separate personal computer.

5.1.1.3 Personal Settings

Menus for typical personal settings for different operators.

5.1.1.4 Wipes

Menus for wipe selection and adjustment

5.1.1.5 Keyers

Menus for keyer adjustment

5.1.1.6 Bgnd Mattes

Menus for adjustment of the background mattes

5.1.1.7 M/E

Menus for M/E adjustment

5.1.1.8 Color Corr

Menus for Color Correction adjustment

5.1.1.9 DPM

Menus for adjustment of the DPM (Digital Picture Manipulators) channels (optional)

5.1.1.10 RAM Recorder

Menus for adjustment of the RAM Recorder (optional)

5.1.1.11 E-MEM

Menus for E-MEM editing

5.1.1.12 Media Player

Menus for media player control

5.1.1.13 Recall Presets

Menus for recalling the different settings

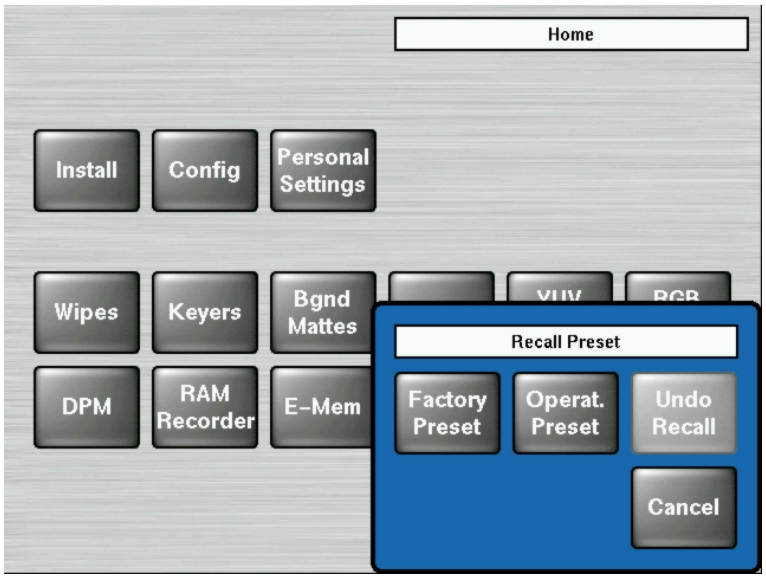


Figure 63 Home Menu - Recall Preset

5.2 Install Menus

The Install menu contains system setups. Most of them are only setups during installation. Some more advanced system functions are not yet supported by the menu. If you want to set these functions now, we advice to run the Sidepanel application on a separate personal computer.

5.2.1 Install - Calibration Menu

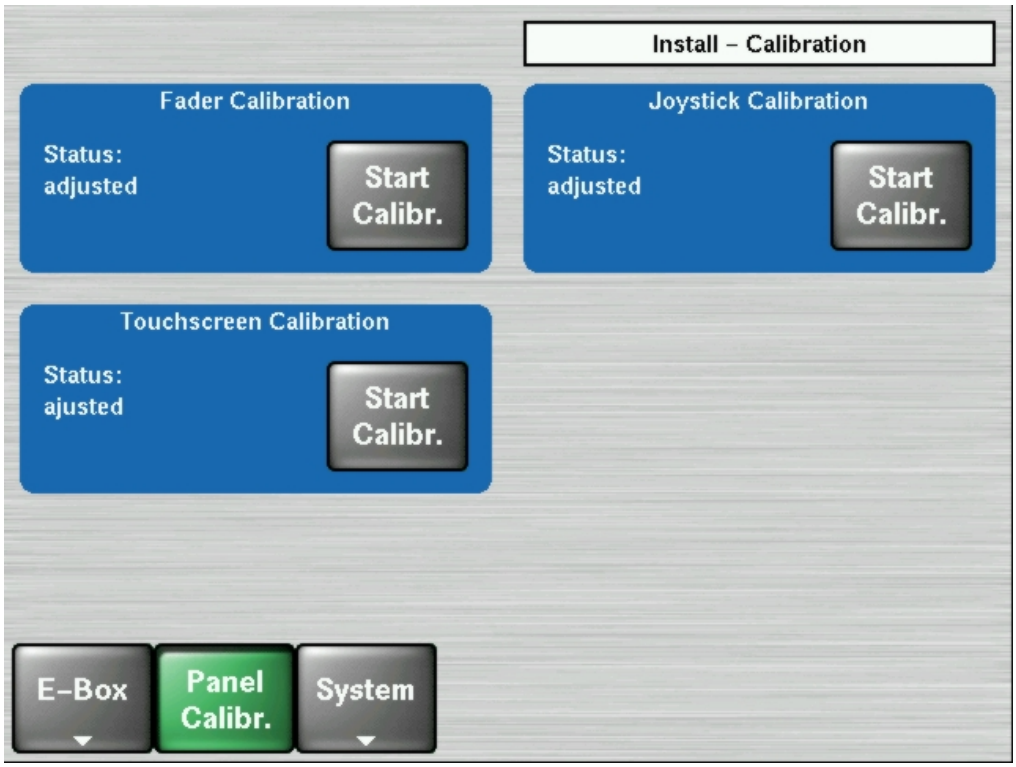


Figure 64 Install - Calibration Menu

5.2.1.1 Fader Calibration

Press **Start Calibr.** button and follow the instructions:

- Move fader to the upper position and press OK
- Move fader to the lower position and press OK

5.2.1.2 Joystick Calibration

Press **Start Calibr.** button and follow the instructions:

- Move joystick to the bottom right corner, twist to left stop and press OK
- Let joystick return to the center position and press OK
- Move joystick to the top left corner, twist to right stop and press OK

5.2.1.3 Touchscreen Calibration

Press **Start Calibr.** button and follow the instructions:

- Please touch the red spot in the top left corner
- Please touch the red spot in the bottom right corner
- Please touch the red spot in the top right corner

5.2.2 Install – E-Box

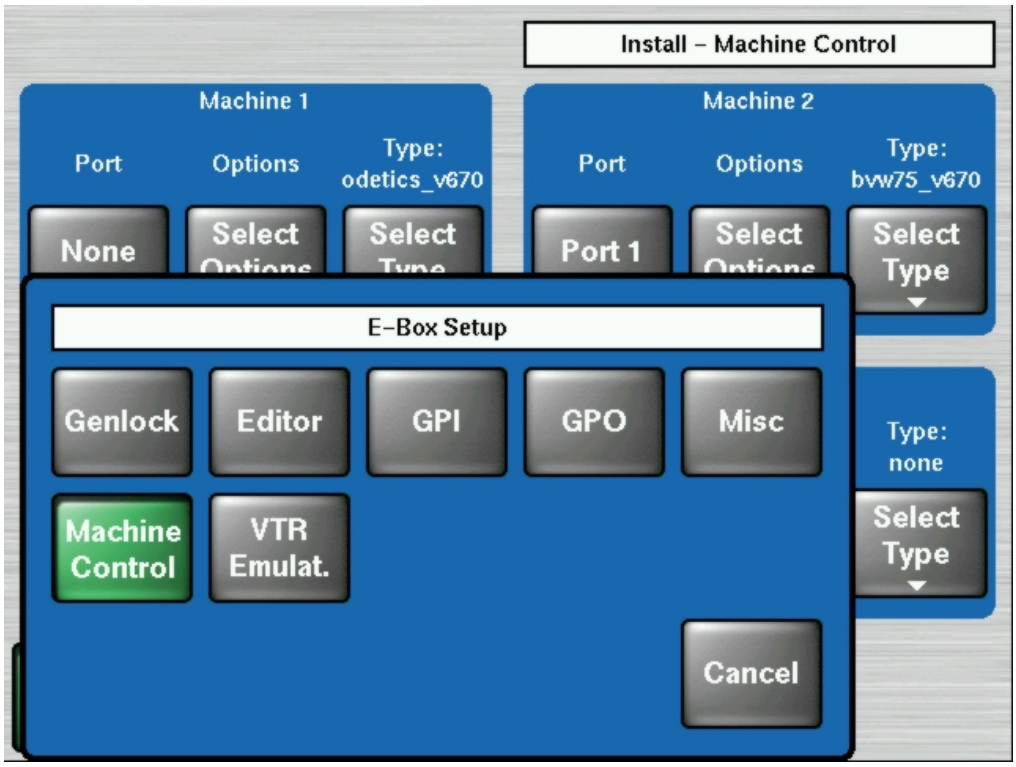


Figure 65 Install – E-Box Setup Dialog

After touching the **E-Box** button in the Home menu a new dialog appears with the following setup items:

- Genlock
- Editor
- GPI
- GPO
- Misc
- Machine Control
- VTR Emulation

5.2.2.1 Install - Genlock Menu

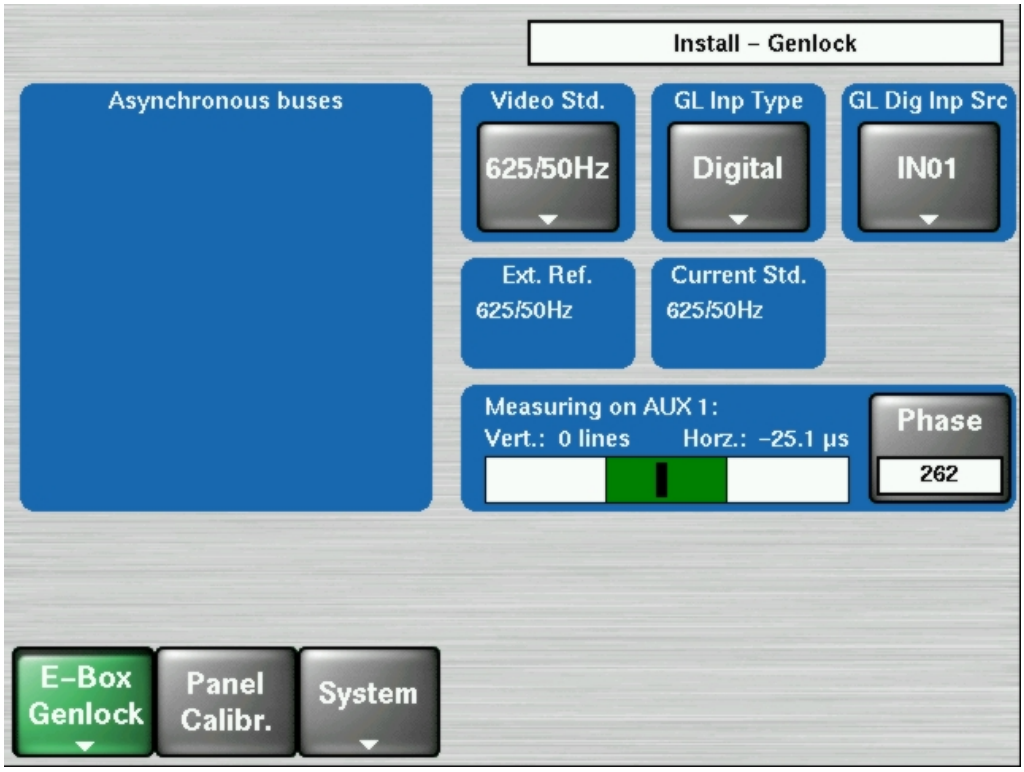


Figure 66 Install - Genlock Menu

- Button **Video Std.**
  Select the desired standard
- Button **GL Input Type**
  Select desired genlock input type **Analog** or **Digital**
- Button **GL Dig Inp Src**
  If **Digital** as genlock input type selected the reference source can be selected

When source signals are fed into the switcher, it must be ensured that the time difference between the sources is not outside the operating range of the internal switcher autophasers (41us). The output signals of the sources must correspond to the timing customary in operation.

The switcher's Genlock Phase can be adjusted to the fed reference signal in the range of –9 line to +10 lines.

The mixers include the possibility to perform the genlock adjustment of the individual input sources in Genlock menu**.**

When adjusting the genlock phase, **all** sources have to be successively checked for their timing by switching up on the bus **Aux1**. Select the inputs with the **GL Dig Inp Src** button.

With **Phase**, the phase relation of the mixer can be shifted +15/–15 lines in comparison with the genlock reference signal. The display (left of the button) serves for checking the timing of the sources. The bar diagram displays the timing of the source to the mixer that is current selected on bus **Aux1**. The bar diagram shows the timing of the input source relatively to the autophasing range. All sources should be timed between the two marker lines in the middle area of the bar. The right line (with the respective switcher type name) marks the earliest mixer input (latest timing of the sources). The left line marks the earliest timing of the sources. The bar is displayed black, if the timing is in the phasing range or yellow, if the timing is outside the phasing range.

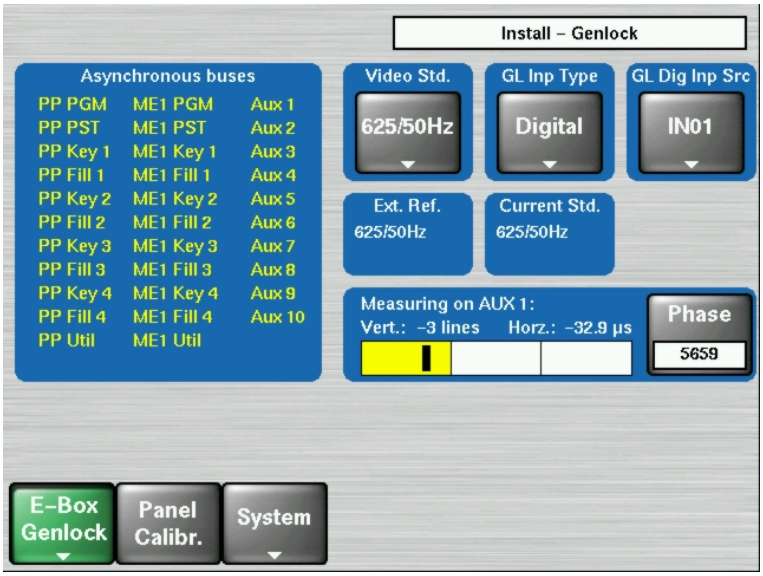

Install – Genlock
Asynchronous buses
PP PGM ME1 PGM Aux 1
PP PST ME1 PST Aux 2
PP Key 1 ME1 Key 1 Aux 3
PP Fill 1 ME1 Fill 1 Aux 4
PP Key 2 ME1 Key 2 Aux 5
PP Fill 2 ME1 Fill 2 Aux 6
PP Key 3 ME1 Key 3 Aux 7
PP Fill 3 ME1 Fill 3 Aux 8
PP Key 4 ME1 Key 4 Aux 9
PP Fill 4 ME1 Fill 4 Aux 10
PP Util ME1 Util
Video Std.
625/50Hz
GL Inp Type
Digital
GL Dig Inp Src
IN01
Ext. Ref.
625/50Hz
Current Std.
625/50Hz
Measuring on AUX 1:
Vert.: -3 lines Horz.: -32.9 µs
Phase
5659
E-Box Genlock
Panel Calibr.
System

Figure 67 Install - Genlock Menu With Asynchronous Buses

The menu shows the following information:

Aux1:	Shows the selected source on the Aux1 Bus witch is used for timing measurement.
Vert:	Shows how many lines the source is off in comparison to the switcher timing.
Hor:	Shows how many us the source is off in comparison to the switcher timing (only if Vert = 0).
Ext. Ref.:	Shows the standard of the Black or Blackburst signal at the genlock input.
Current Std.:	Shows the standard of the Black or Blackburst signal at the genlock input.

5.2.2.2 How to Adjust the Genlock Phase

- Make sure that the switcher is set to the same standard as the external reference and the sources.
- The video standard of the switcher can be modified by selecting the parameter **Video Standard** in the **Install E-Box** menu. Then push **Modify** to open an overlay with the selection modes **Auto Detect** (default), **625Lines/50Hz**, **525Lines/60Hz**. Confirm the selected mode with **OK**.
- Select a video source on Aux1. To adjust the genlock phase select **Genlock Phase**. Pressing **Modify** opens an overlay and delegates the digipots to adjust the phase.
  At first make a coarse adjustment that the display shows **Vert: 0 Lines** (For a quick adjustment the bar in the overlay can be dragged with the mouse.) If **Vert: 0 Lines** the display shows the horizontal offset. This offset should be for all inputs in the range of 0 ... –41us. This phasing range is also displayed in the horizontal bar. For a correct adjustment the bar should be black.
- Select all inputs on Aux1 and correct the timing if necessary.
- Finally all inputs should be in the range of 0 ... –41us

NOTE!
*The sources on **Aux1** (Timing index card) can also be selected by clicking with the mouse on Aux1 and selecting a source from the overlay. Adjusting the genlock phase may cause disturbances on monitors especially during coarse adjustment.*

5.2.2.3 Install - Editor Menu

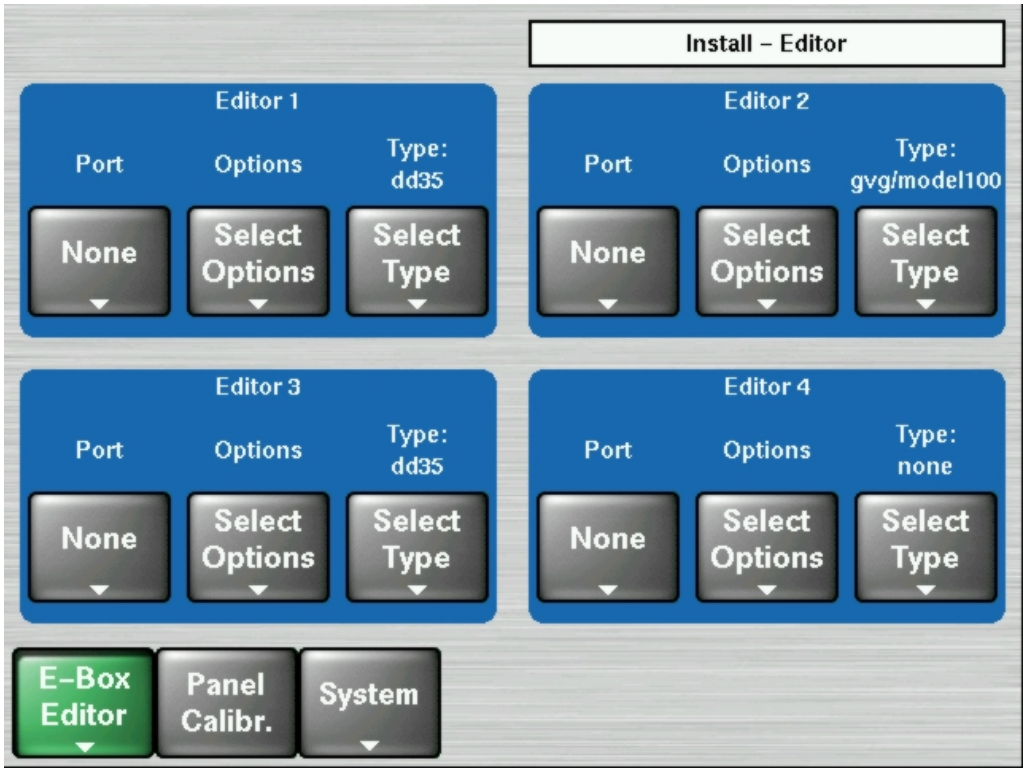


Figure 68 Install - Editor Menu

The Editor menu permits to configure the serial ports 1 … 6.

- Select **Port #** (Port 1 –6)
- Select protocol type
- For some remote protocols configuration options are selectable. The options can be selected by pressing the **Select Options** button.

Special Editor Protocol BVE-2000 Options:

1. Wipe Mapping: “GVG Pattern Numbers”, “XtenDD Pattern Numbers”
2. DSK Support: “BVE2000”, “default”
3. DSK Mapping: “to Key4”, “to Key3”

Default settings are underlined!

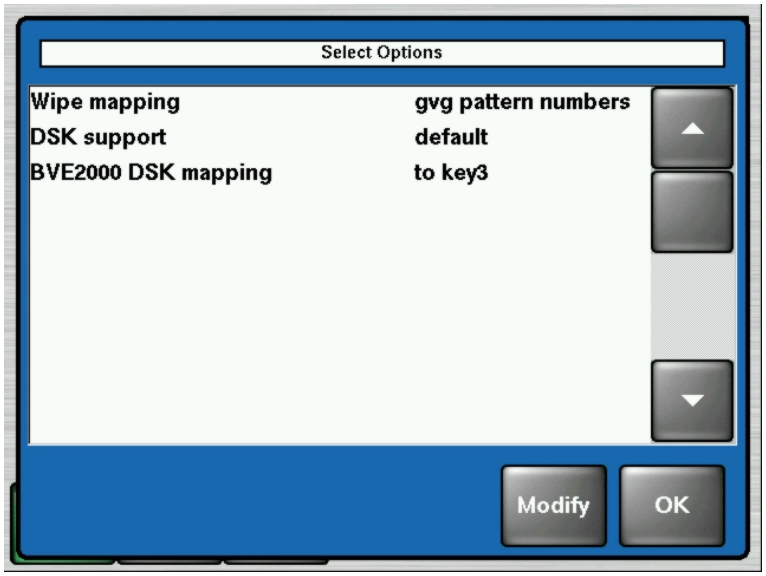


Figure 69 Install - Editor Menu

5.2.2.4 Install - GPI Menu

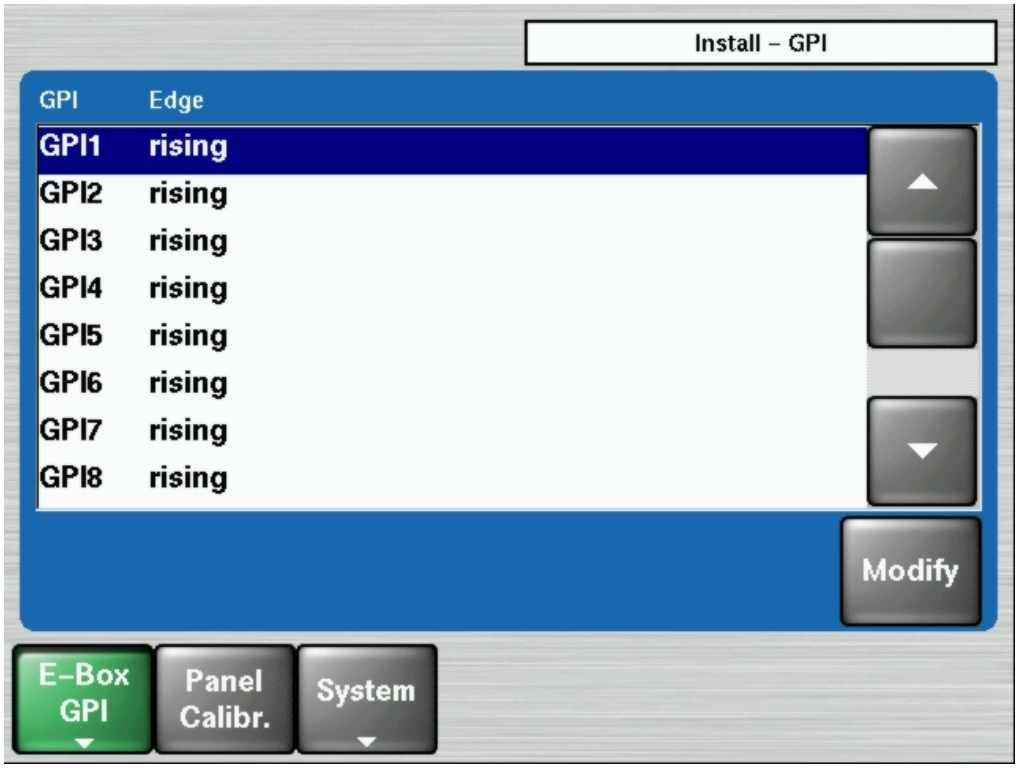


Figure 70 Install - GPI Menu

- Select **Modify** to determine wheatear the rising or falling edge of the arriving signal **GPI1 ... 8** is to be used.

NOTE!
A GPI is considered Active when current flows through the LED of the opto-coupler at the GPI input. When no current flows the GPI is Inactive. Hence a Rising edge is the transition from Inactive to Active, and a Falling edge is the transition from Active to Inactive.

5.2.2.5 Install - GPO Menu

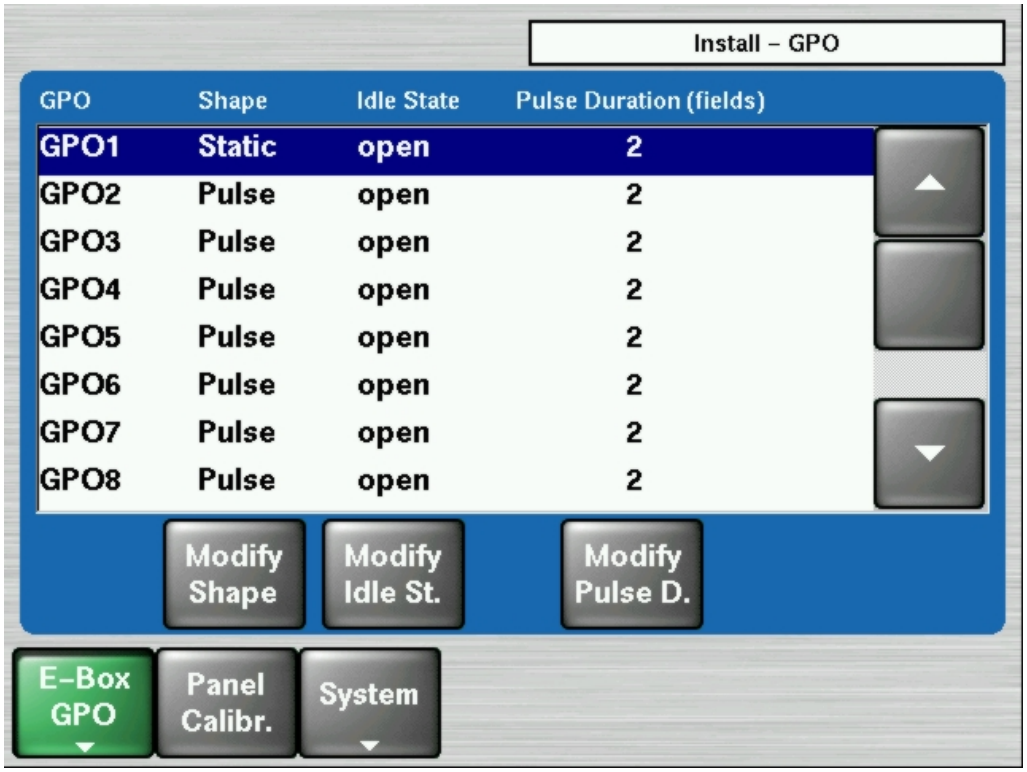


Figure 71 Install - GPO Menu

Select **Modify …** to change the parameters:

- **Shape:** Pulse / Static
- **Idle State:** open / closed
- **Pulse Duration:** Enter the preroll time in frames (max 255 frames)

5.2.2.6 Install - Misc Menu

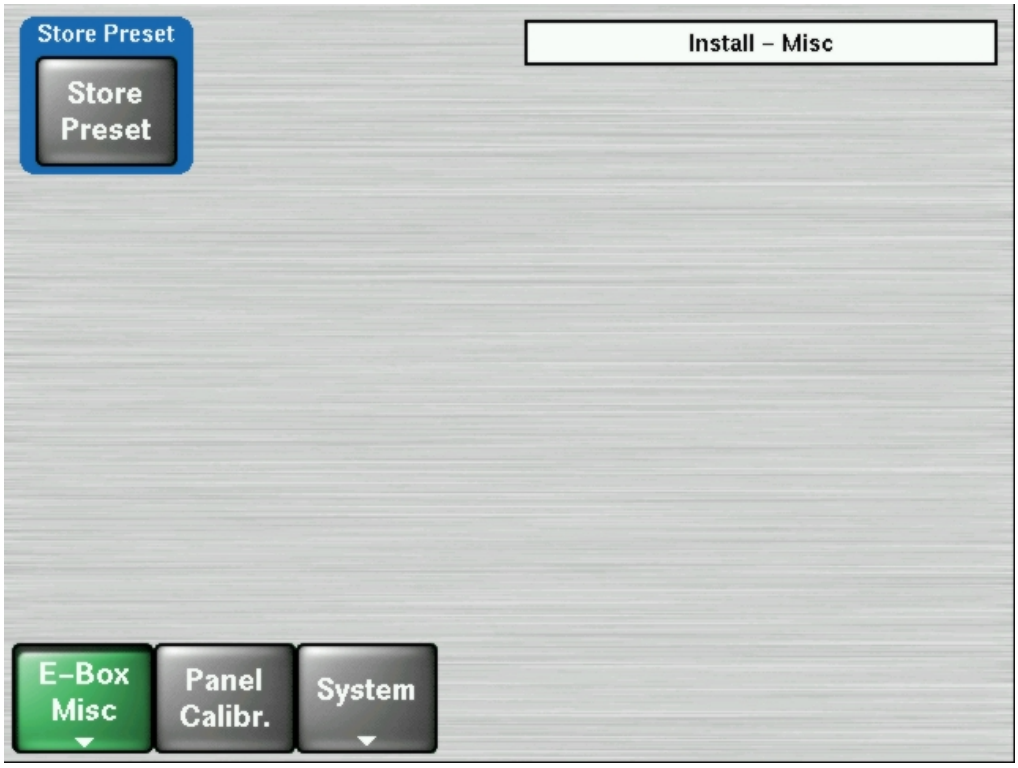


Figure 72 Install - Misc Menu

- Pressing **Store Presets** the panel user settings are saved. To recall the settings use the **Recall Preset** button in the Home menu.

5.2.2.7 Install – Machine Control

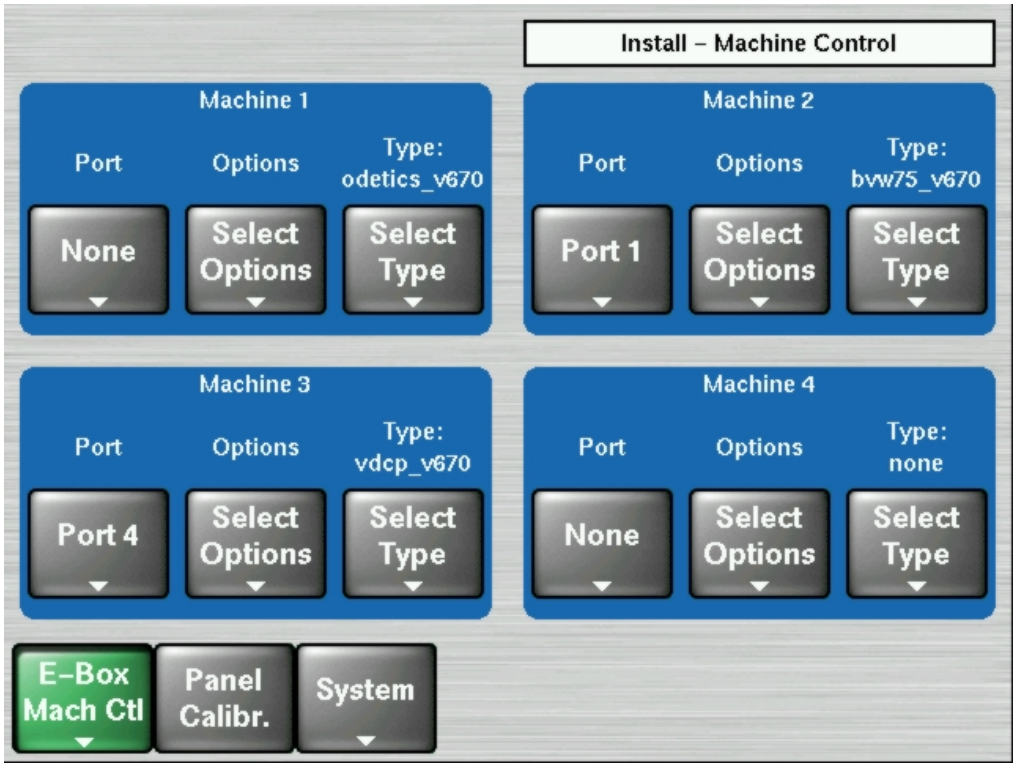


Figure 73 Install – Machine Control Menu

- Up to four external machines (VTR, DiscRecorders, LaserDiskPlayers) can be connected via Port 1…4. The menu serves to set the respective port numbers and protocol types.

- For some remote protocols configuration options are selectable (all GVG200 based protocols, AMP, Odetics, VDCP, BVW75).
  The options can be selected by pressing the **Select Options** button (see details below).

- Select option and change value by pressing the **Modify** button.

Special Machine Control Options:

VDCP Protocol Options:

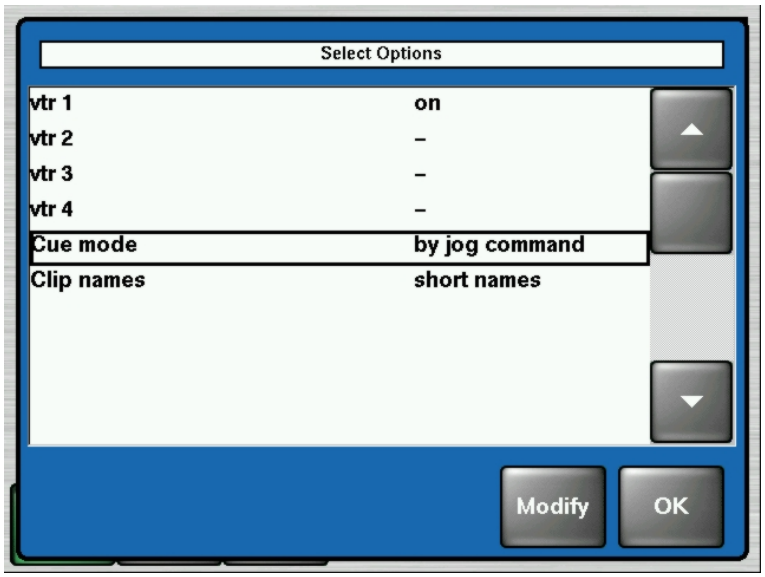


Figure 74 VDCP Protocol Options

1. VTR 1 – 4: Use this options to select the disk servers local video ports
2. Cue mode: “by jog command”, “default cue”
   When a clip is cued (“Go To Timecode”, “Go To MarkIn/MarkOut”) most disk servers are (re)initializing their local video port. While initializing the port the signal is switched to black for a short time. After cuing is completed it is usually not possible to play the clip to a timecode position less than the cueing timecode. The Cue Mode options “by jog command” prevents the disk server from (re)initializing the local video port.
   NOTE!
   Not all disk servers are supporting this option.
3. Clip names: “long names”, “short names”
   To select and activate clips with more than 8 character length, the option “long names” can be used. This option requires that the disk server also supports long clip names. The default setting “short names” should be supported by every disk server.

   Default settings are underlined!

ODETICS Protocol Options:

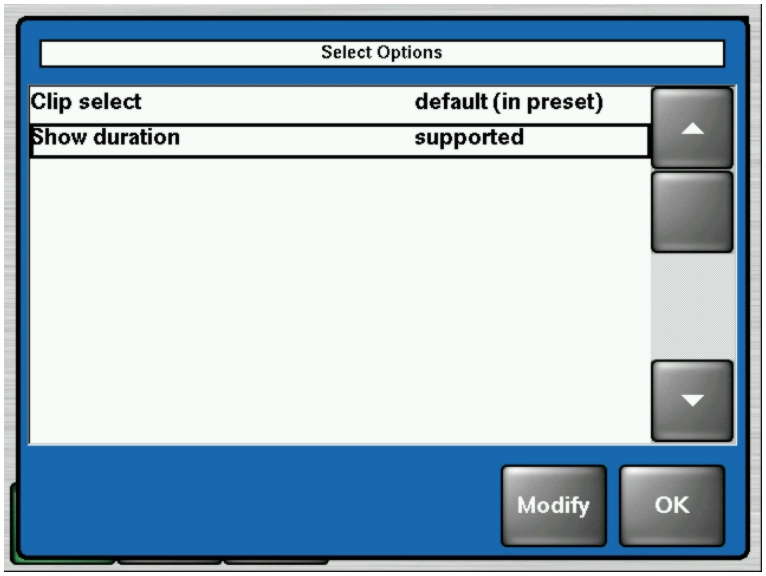


Figure 75 ODETICS Protocol Options

1. Clip select: mode1 (cue up), default (in preset)
   If clip selection with ODETICS doesn't work on default, use the "mode 1 (cue up)" option
2. Show duration: supported, not supported
   If the connected disk server supports an ODETICS protocol variant that supports clip duration requests, use the option "supported".

   Default settings are underlined!

BVW-75 Protocol Options:

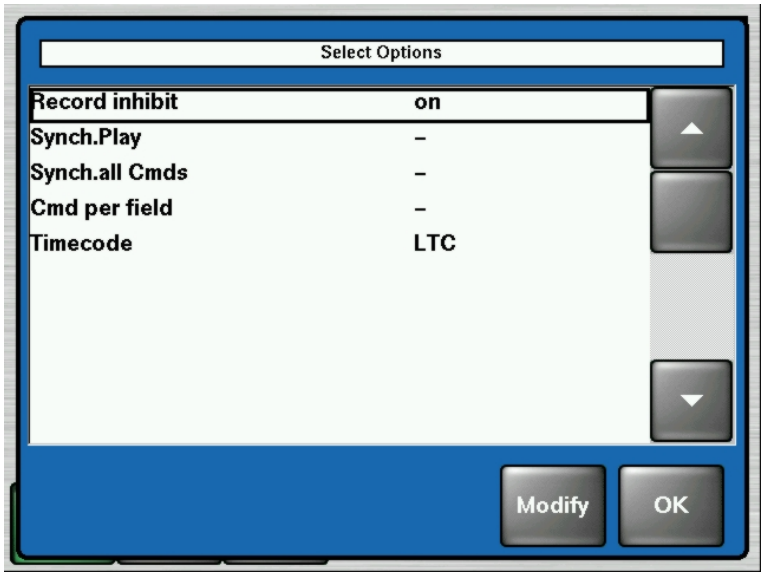


Figure 76 BVW-75 Protocol Options

1. Record Inihibit: “on” / “off”
   Prevents deleting already recorded material. The Rec command will be switched to a Play command.
2. Synch.Play: “on” / “off”
   Synchronized the Play command for 4 machines. This option is needed to synchronize all 4 machines (or these machines which have switched on this option).
   NOTE!
   Only the Play command will be synchronized.
3. Synch.all Cmds: “on” / “off”
   Option like Synch.Play, all Tape Motion commands will be synchronized.
4. Cmd per Field: “on” / “off”
   Because of the limitation of some VTRs in “on” state only one operating command per field will be transmitted.
5. Timecode: „LTC“ / „CTL“ Selecting the timecode mode

Default settings are underlined!

AMP Protocol Options:

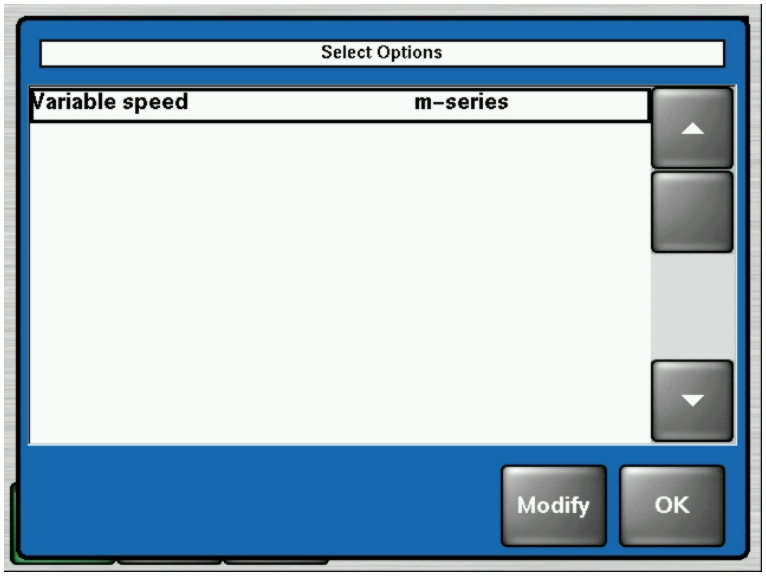


Figure 77 ODETICS Protocol Options

1. Variable speed: “m-series”, “default”
   If a M-Series server cannot be controlled by using the Variable Speed controls with in the Sidepanel PC or the KayakDD panel menu, select the option “m-series”.

   Default settings are underlined!

5.2.2.8 Install – VTR Emulation

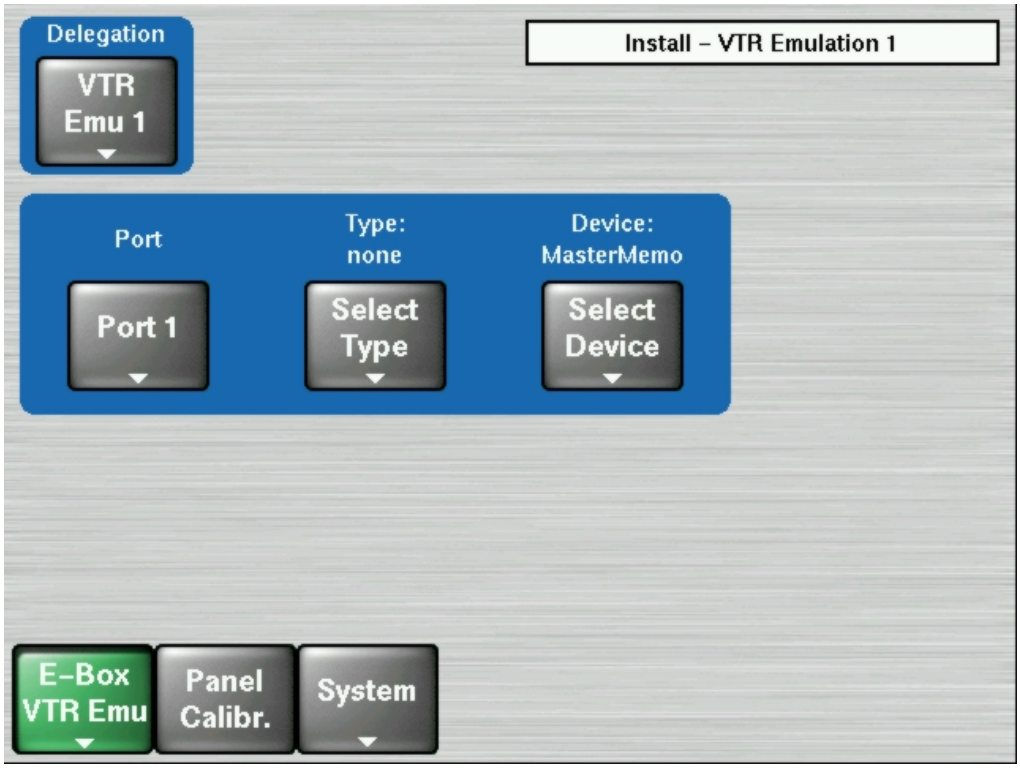


Figure 78 Install – VTR Emulation

VTR Emulation provides a mechanism to control internal VTR based switcher components by external editors using the BVW75 protocol. VTR based components in KayakDD are TiM/E-Memo (Master, PP, ME1) and RAM Recorder (Channel 1 - 4).
It is possible to control up to 5 component instances simultaneously.

To setup an VTR emulation session, select the number of the serial KayakDD port (**Poet** button) that is connected to a corresponding serial port of the editor. Select the BVW75 protocol with the **Select Type** button. After the internal component is selected (**Select Device** button), the chosen switcher instance can be controlled by the editor device. To setup additional sessions use the **VTR Emulation Delegation** button.

NOTE!
Port and protocol type are environment data and therefore independent from loading and saving an application. In contrast the type of the internal component to control is stored within an application.

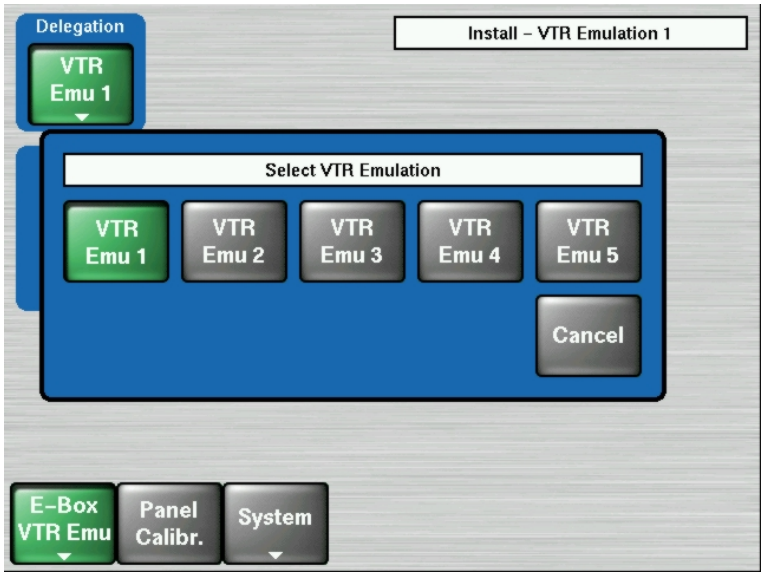


Figure 79 Install – Select VTR Emulation

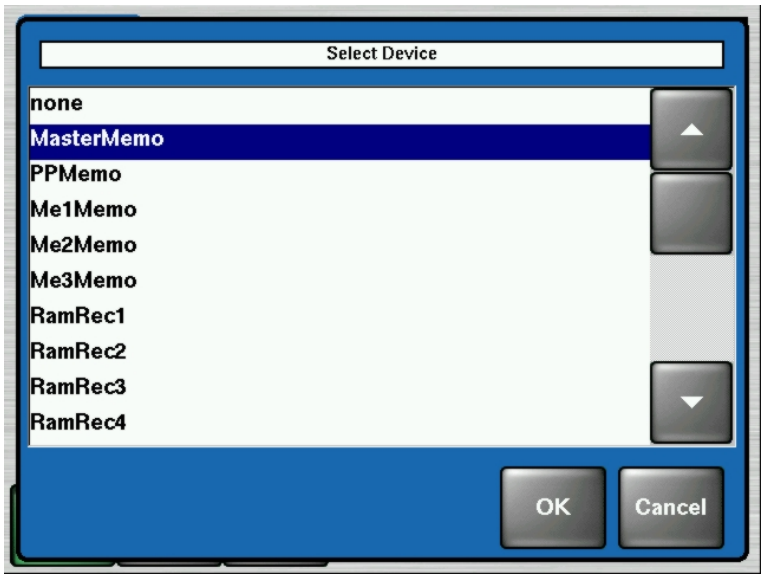


Figure 80 Install – Select VTR Emulation Devices

5.2.3 System Setup Menu

The System Setup menus can be selected via **Home – Install – System** menu

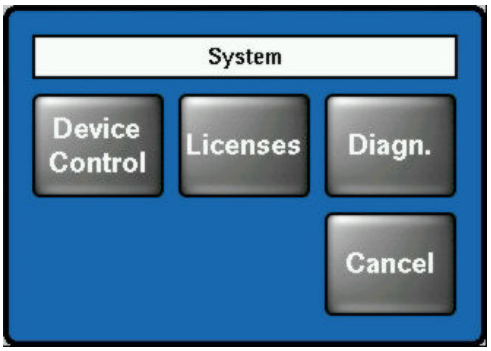


Figure 81 System Setup Dialog

After touching the **System** button a new dialog appears with the following setup items:

- Device Control
- Licenses
- Diagnosis

5.2.3.1 Device Control Menu

The Device Control menu shows on the left all in the network connected devices (**Kayak-MF** = Mainframe, **Kayak-CP** = Control Panel) with IP address and software version installed.

On the right details of the selected device are listed.

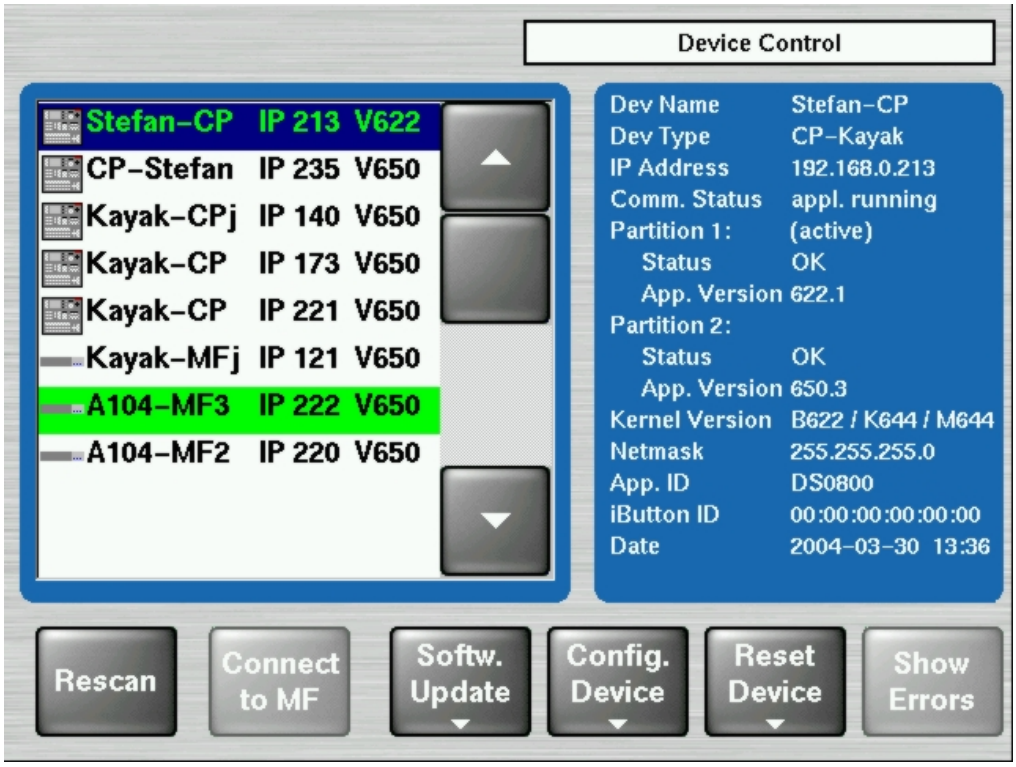


Figure 82 Device Control Menu

- **Rescan** button
  The network will be scanned and all devices (CP=panels, MF=video processor frame) are listed with device name, IP address and software version installed.

- **Connect to MF** button
  This button is used to connect the control panel to the mainframe selected in the list.

5.2.3.2 Software Update

Plug-in the memory stick in the control panel's USB 2 or USB 4 slot. In case that your stick doesn't fit (mechanically) in USB4 slot, please use the enclosed extension cable as adapter.

If the control panel software has recognized a valid Kayak release version on the memory stick, the Device Control menu is called automatically. The Device Control menu shows all in the network connected devices (Kayak-MF = Mainframe, Kayak-CP = Control Panel) with IP address and software version installed.

- Select the respective device in the menu list.
- Menu **Software Update** appears
- Push button **Start Install**.
- The correct software will be installed in the respective device (MF or CP) automatically.

NOTE!
Two partitions are availably in the flash for the application software. With "Start Install" the empty or a partition which is older as the active partition (recommended) will be updated. With "Install Part. X" the current active software will be updated.

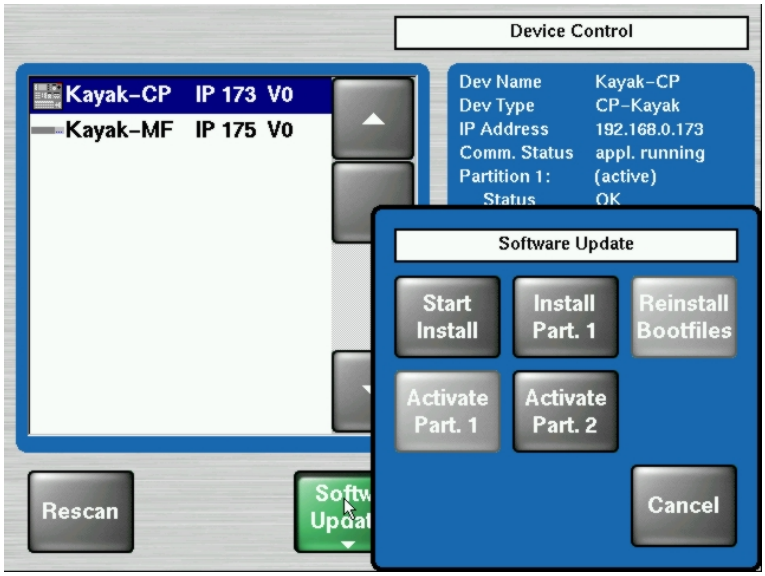


Figure 83 Device Control Menu With Software Update Dialog

- After pressing the **Start Install** button the available versions are shown. Select the version to install. The installation procedure starts.

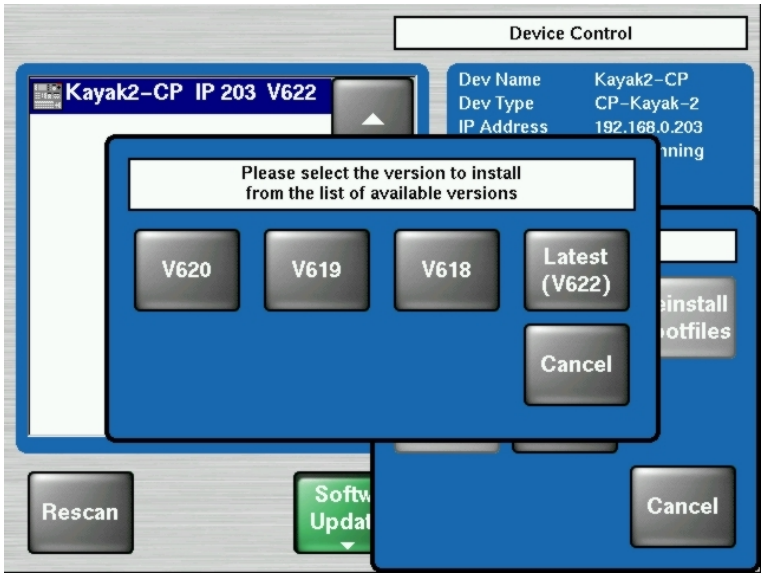


Figure 84 Start Installation Procedure

- The progress of the installation procedure is displayed in percent. The currently installed file (file name) is shown as well.

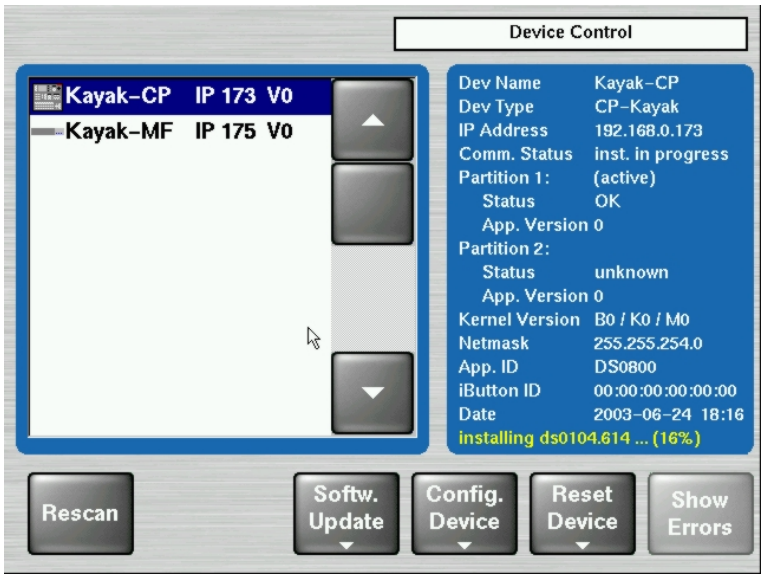


Figure 85 Installation Procedure

- The Installation Procedure can be cancelled by using the button **Abort Install** in the menu **Software Update**.

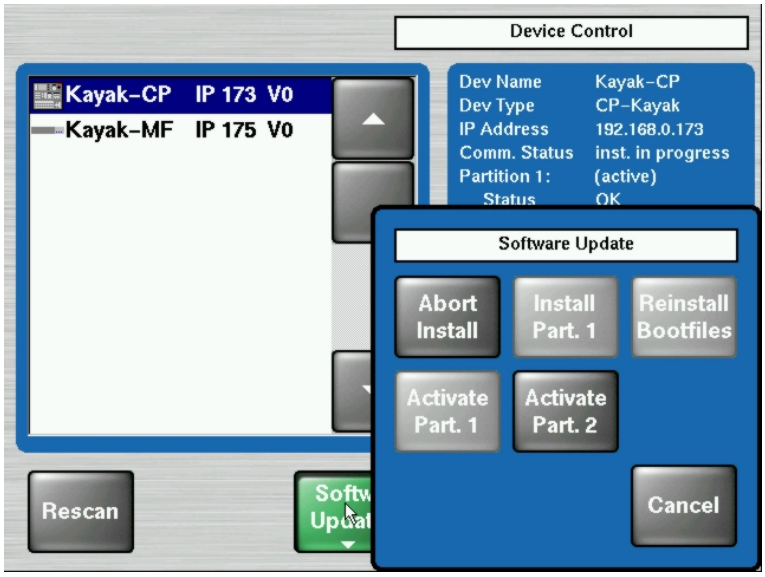


Figure 86 Cancel Installation Procedure

- After canceling the installation, the Status "**inst. failed**" is displayed.
- The respective partition can not be used and not be activated.
- After finishing the installation procedure, the system ask you "**Do you want to reset the device now?"** The installed software is availably after a restart only!

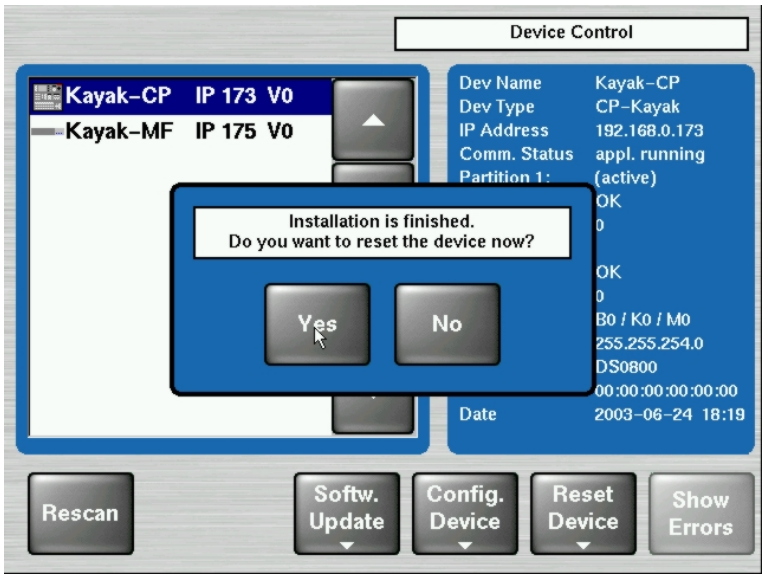


Figure 87 Finish Installation

Important NOTE!

- ***Do not cancel the installation by switching off the devices!***
- ***Do not pull out the memory stick during the installation procedure!***
- ***Cancel the installation with the Abort Install button only!***
- ***Perform a reset after each device software upgrade***
- ***Verify that the active partition shows the new software version (e.g. 6.2.2.8).***

5.2.3.3 Updating the CPLD Firmware

At the end of each installation process the system checks whether an CPLD update is necessary. This is done by comparing the versions of the installed CPLD firmware files on flash with the current CPLD version tags stored within an EEPROM of each hardware board. If the version of at least one file is newer an update of the CPLD is necessary and the user is notified.

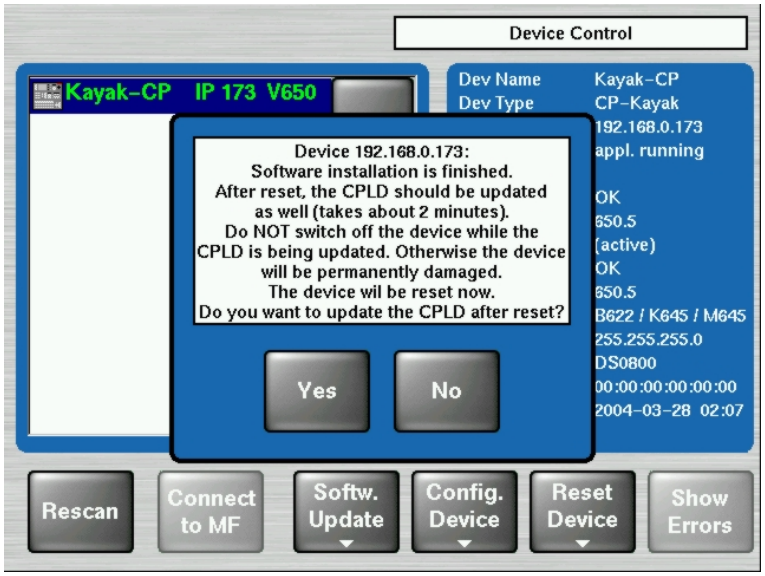


Figure 88 CPLD Update

To skip the CPLD update press **No**, to confirm the update press the **Yes** button (recommended). After the user has confirmed the update, the device will be restarted. During this sequence the CPLD will be updated. The progress of the update procedure is displayed in percent within the Device Control menu. The currently installed file (file name) is shown as well.

Don't change to a menu other than the Device Control menu after initiating an CPLD update on a Kayak mainframe! Otherwise the update process can't be monitored.

CAUTION!
Do NOT switch off the device while the CPLD update is running – monitored by red progress indication. Otherwise the device will be permanently damaged!

After the CPLD update is finished the system has to be restarted. This brings the device to normal operation mode.

If the installation process is terminated from the system refer to the Trouble Shooting in the Planning and Installation manual.

5.2.3.4 Configure Device Menu

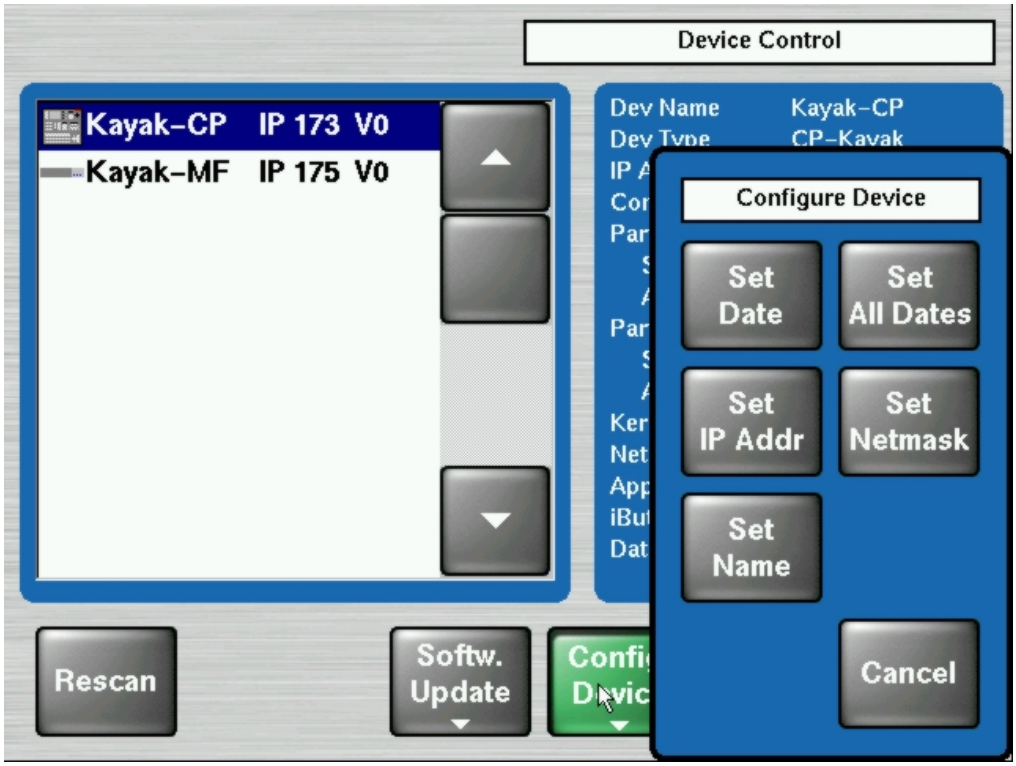


Figure 89 Configure Devices

With the menu "Configure Device" the following configuration data of a device can be changed:

- The date and time of the selected device (**Set Date**)
- The date and time of all connected devices (**Set all Data**)
- IP Address of the selected device (**Set IP Addr**)
- Net mask of the selected device (**Set Netmask**)

  Important Remark:
  This function should be used by a qualified network administrators only. Different netmasks for MF and CP lead to limited communication between the net devices.

- Logical device name ("**Set Name**"). Default Kayak-MF or Kayak-CP, the name is can be defined by the user.

5.2.3.5 Reset / Check / Clear Device Menu

The menu „Reset/Check/Clear Device“ should be used by qualified users only!
The following functions can be configured:

Touch **Reset Device** to Start/Restart/Check the following devices:

- Reset to Kernel
- Reinit iButton
- Re-initialize the RAM disk area on the flash (**Clear RamDisk**)
- Re-initialize the Application disk area on the flash (**Clear AppDisk**)
- Re-initialize the DPM FX disk area on the flash (**Clear DPM FX**)
- Deleting the Application State (**Clear AppState**)
- Deleting the Operational State (**Clear OpState**)
- Re-initialize the State Memory Partition (**Clear StateMem**)
- Factory Clear
- File system check of four flash partitions (**Check" Flash 0...2**)

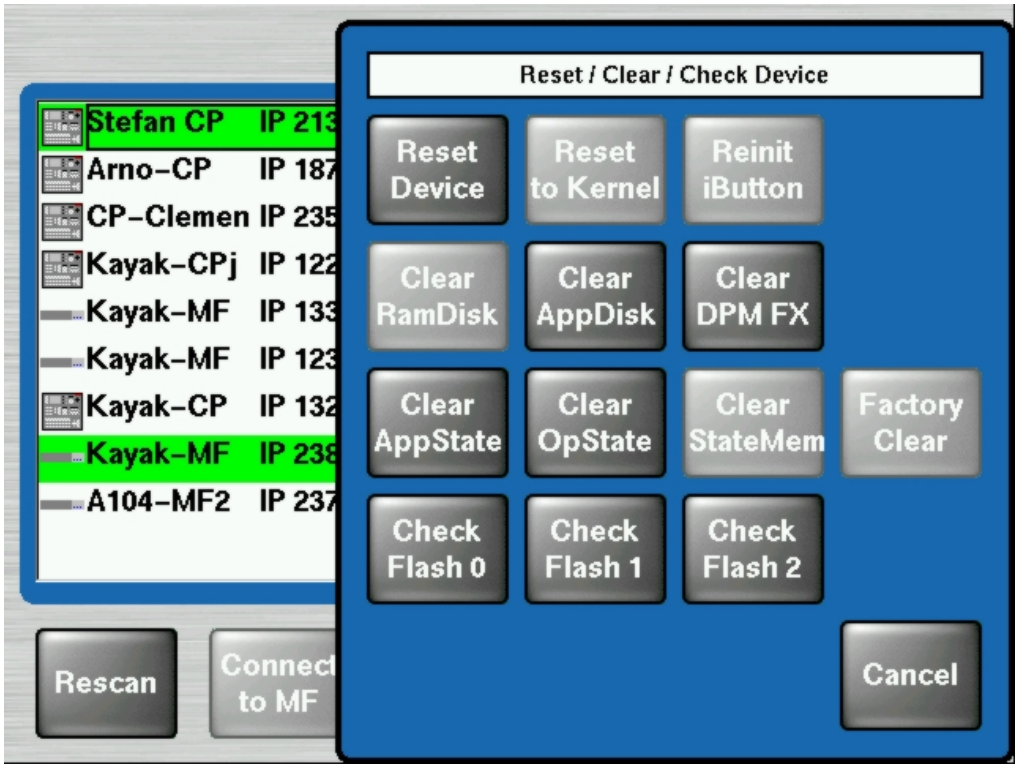
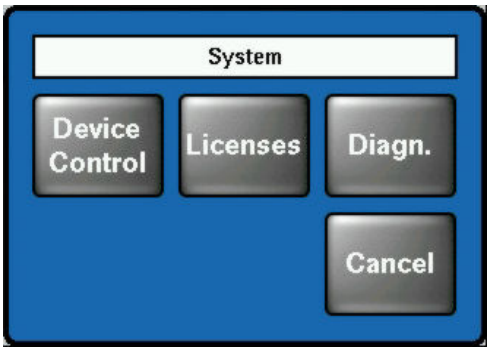


Figure 90 Reset/Clear/Check Devices Menu

NOTE!
The reset and clear functions with bright gray buttons are protected against unintentional starting. The button will be activated by pressing Menu Lock + Reset Devices.

5.2.4 Licenses Menu

The Licenses menu can be selected via **Home – Install – System** menu



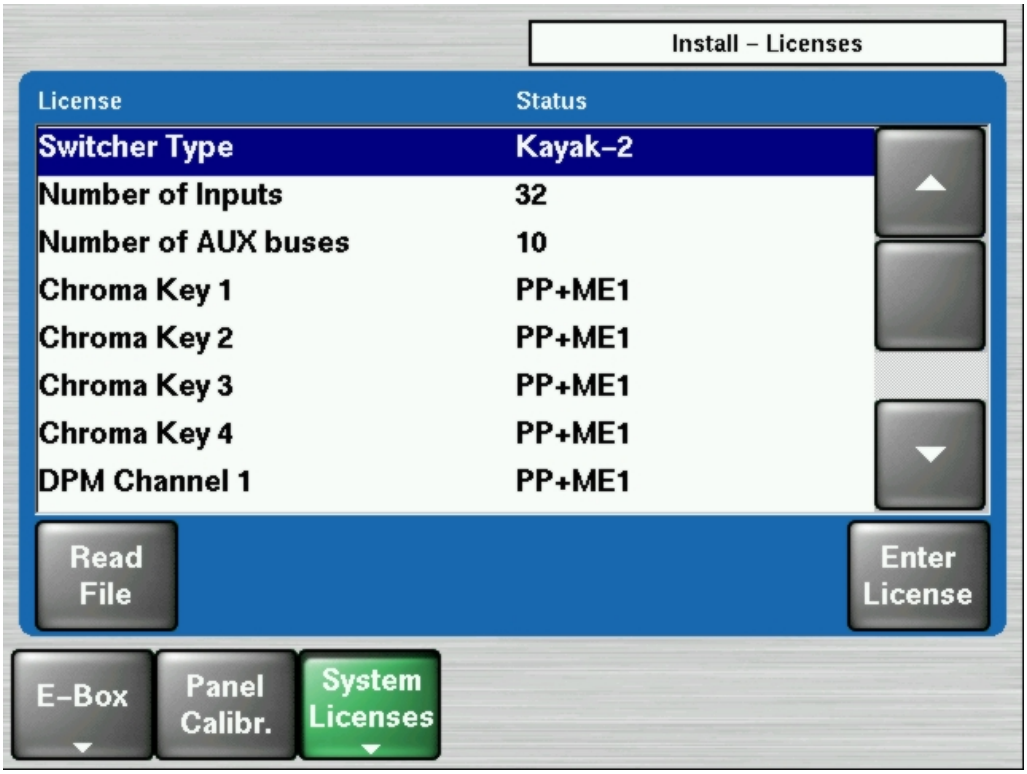


Figure 91 Install Licenses Menu

5.2.4.1 License Handling with USB Stick (recommended)

- Copy the file “sp_license.txt” directly of your USB Stick.
- Insert the USB Stick at the control panel USB port 2 or 4 and enter the “Install / System licenses / Licenses” Menu.
- Push the button “**ReadFile**” and follow the instructions.

5.2.4.2 Manual Entry

A license is a text line in the following format (example a chromakey license):

```
key="LIC_CHROMA_KEY1","1","0000:00:00","9999:12:31","00:00:00:22
:1e:ec","8-xyz","3489c00db5b1c548e9daf7fbe0ed67eb21"
```

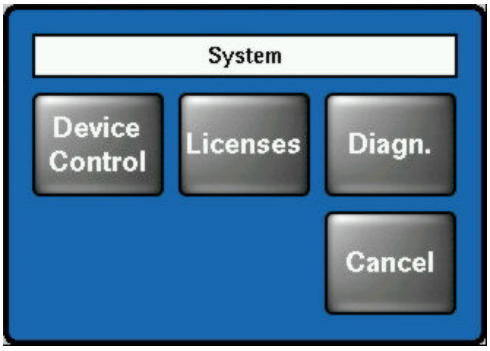
It contains:

License name:	`LIC_CHROMA_KEY1`
License value:	`1`
Start date:	`0000:00:00`
End date:	`9999:12:31`
iButtonID:	`00:00:00:22:1e:ec`
wksID:	`5-xyz`
LicenseKey:	`3489c00db5b1c548e9daf7fbe0ed67eb21`

- Enter the “Install / System licenses / Licenses” Menu.
- Select the option LIC_CHROMA_KEY1 with the menu cursor
- Push the “Enter License” button
- A window appear with headline “Enter value for Chroma Key 1”
  _ Enter the value 1 (without quotation marks) and press OK
- Next window: “Enter start date for Chroma Key 1”
  _ Enter the value 0000:00:00 (without quotation marks) and press OK.
- Next window: “Enter end date for Chroma Key 1”
  _ Enter the value 9999:12:31 (without quotation marks) and press OK
- Next window: “Enter iButton ID for Chroma Key 1”
  _ Enter the value 00:00:00:22:1e:ec (without quotation marks) and press OK
- Next window: “Enter wks ID for Chroma Key 1”
  _ Enter the value 8-xyz (without quotation marks) and press OK
- Next window: “Enter license for Chroma Key 1”
  _ Enter the value 3489c00db5b1c548e9daf7be0ed67eb21
  (without quotation marks) and press OK
- If all values are correct the license will be installed successfully. Enter all the remaining licenses in the same way and do a power cycle at the mainframe afterwards.

5.2.5 Diagnosis Menu

The Diagnosis menu can be selected via **Home – Install – System** menu



The Diagnosis system shows all internal Error Messages from the selected devices.

Button **Diagn Enable** enables / disables the diagnosis in the attached control panel or in the connected mainframe.
The menu is divided in two sections. In the left list field all devices (panels, mainframes) in the network are listed. Devices marked with a yellow warning symbol has produced internal error messages. After selecting the device the respective error messages are listed in right list field

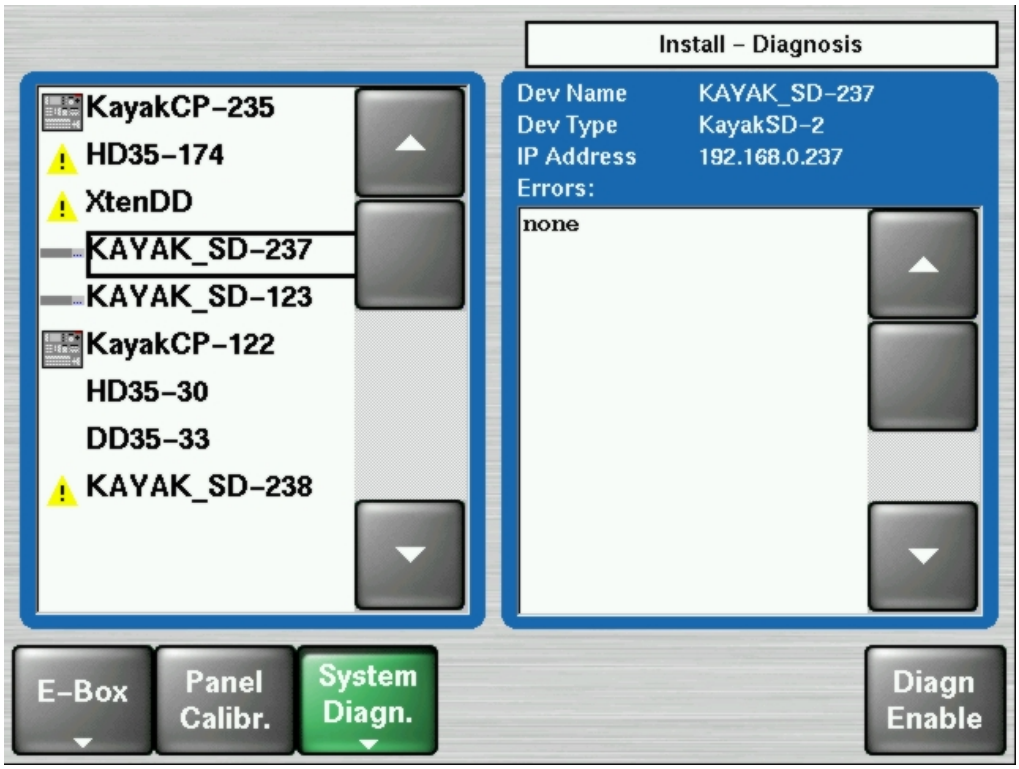


Figure 92 Install Diagnosis Menu

5.3 Config Menus

After touching the **Config** button in the Home menu a new dialog appears with the following configuration items:

- Application Control
- E-Box Configuration (GPI, GPO, …)
- Panel Assignment

All configuration setups are part of an application and can be stored and recalled as an application.

5.3.1 Application Control

The application menu is designed to handle the use of applications within a KayakDD system. Applications can be loaded from a memory stick and started, stopped, modified or created new.

NOTE!
Please save your application data regularly on a memory stick! Application data are stored in the internal RAM and can be lost, if the lifetime of the battery ends!

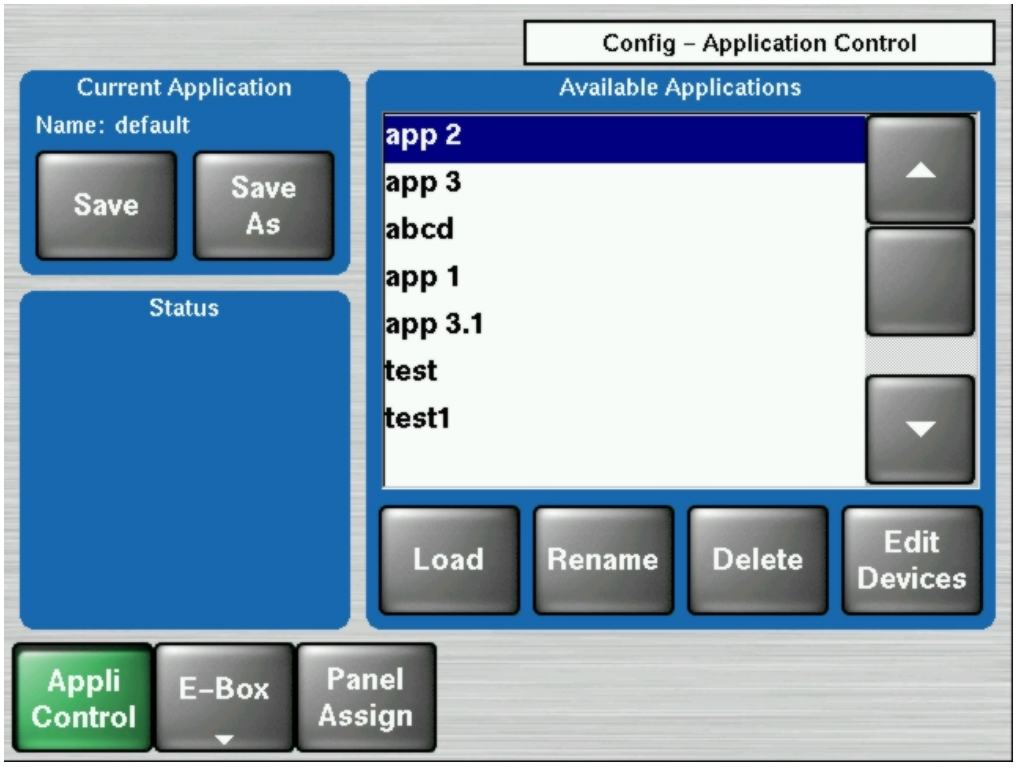


Figure 93 Config – Application Control

The Application menu shows a list of the available applications of the connected Mainframe.

NOTE!
If no memory stick is plugged in, the buttons are not active (light gray).

Operating buttons:

- **Save** button, saves the current application
- **Save As** button, saves the current application with a selectable file name
- **Load** button, loads the application files from the memory stick into the KayakDD
- **Rename** button, opens a dialog window to rename the selected application file.
- **Delete** button, deletes the selected application file

- **Edit Devices** button
  If an application file was loaded which stored in another switcher system, the device names of this application must be customized. A list appears with the IP addresses of the former devices.

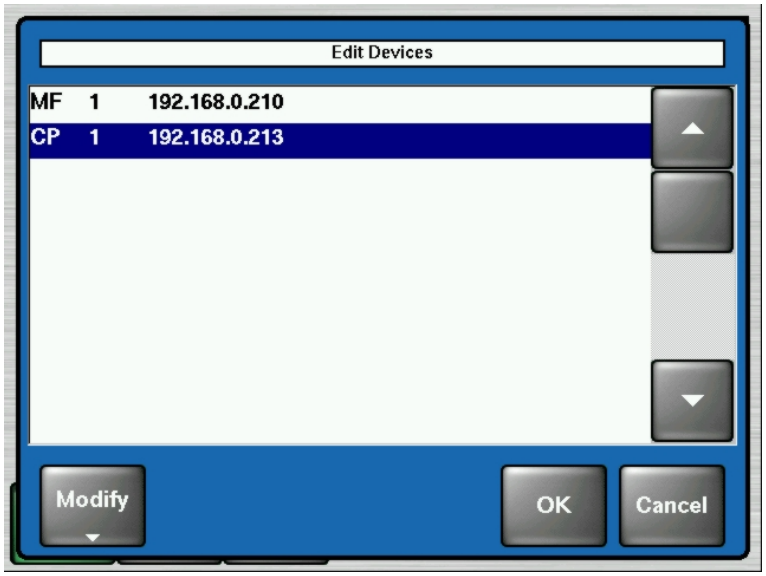


Figure 94 Config – Application Control – Edit Devices

- Select control panel and press **Modify** to generate a list of connected devices (figure below) in the network.
- Select the IP address of the desired device and press OK to update the application file

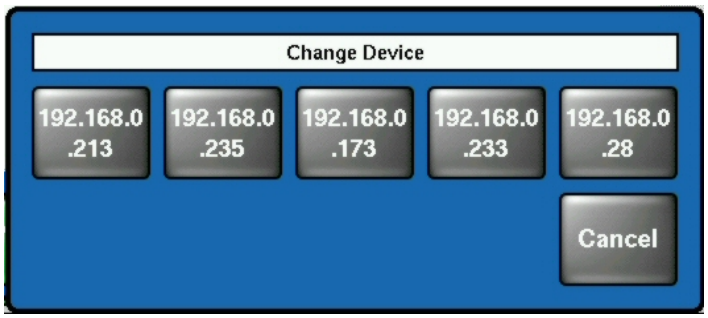


Figure 95 Config – Application Control – Change Devices

5.3.2 E-Box Configurations

After touching the **E-Box** button in the Config menu a new dialog appears with the following configuration items:

- GPI
- GPO
- Key Couple
- AUX
- M/E
- DPM
- Misc

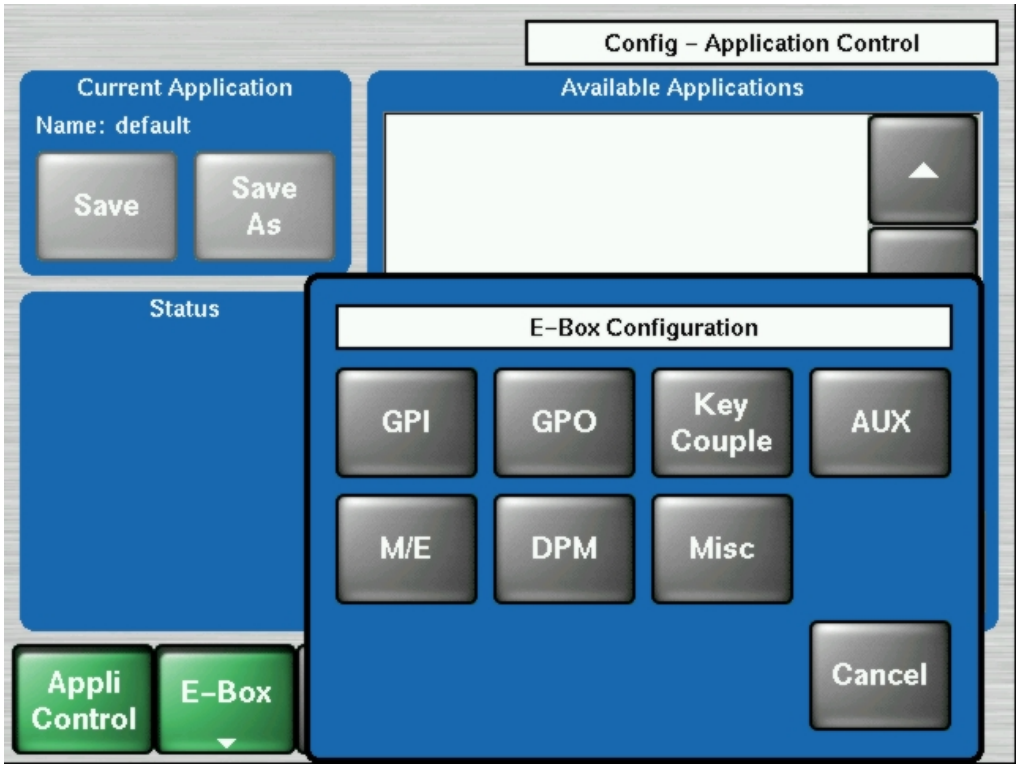


Figure 96 Config – E-Box Configuration

5.3.2.1 Config - GPI Menu

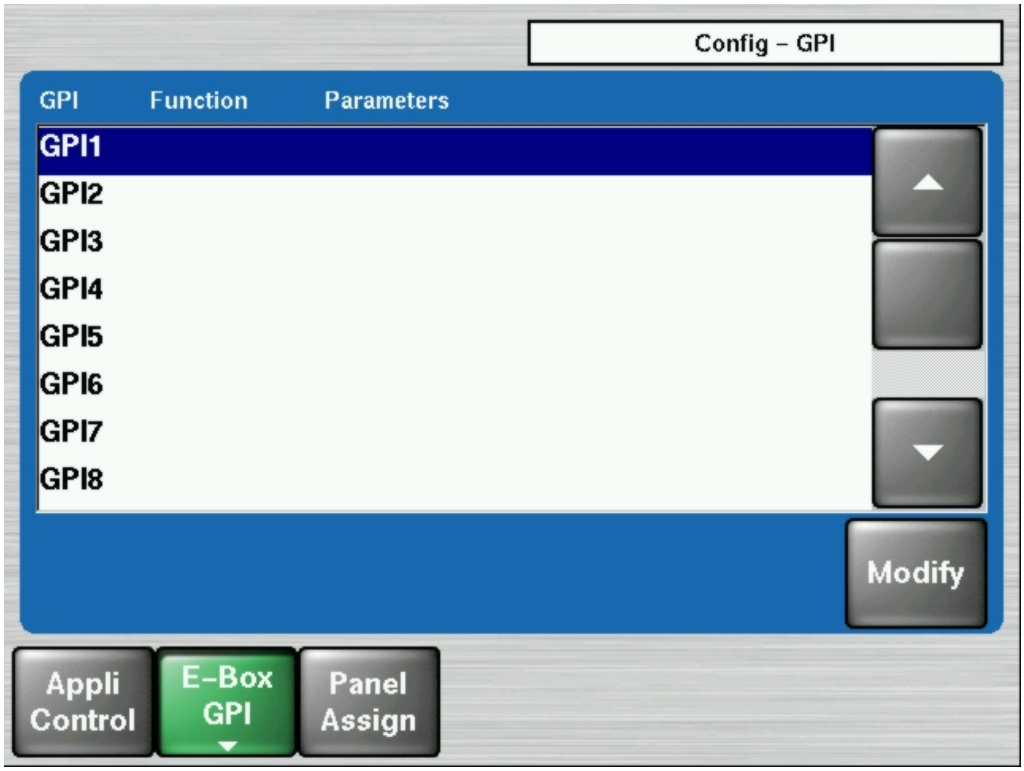


Figure 97 Config - GPI Menu

Touching the **Modify** button calls a pop–up lists. The selected function will be triggered on the edge defined in Install menu.

Figure 98 Config - GPI Functions

5.3.2.2 Config - GPO /Tally Menu

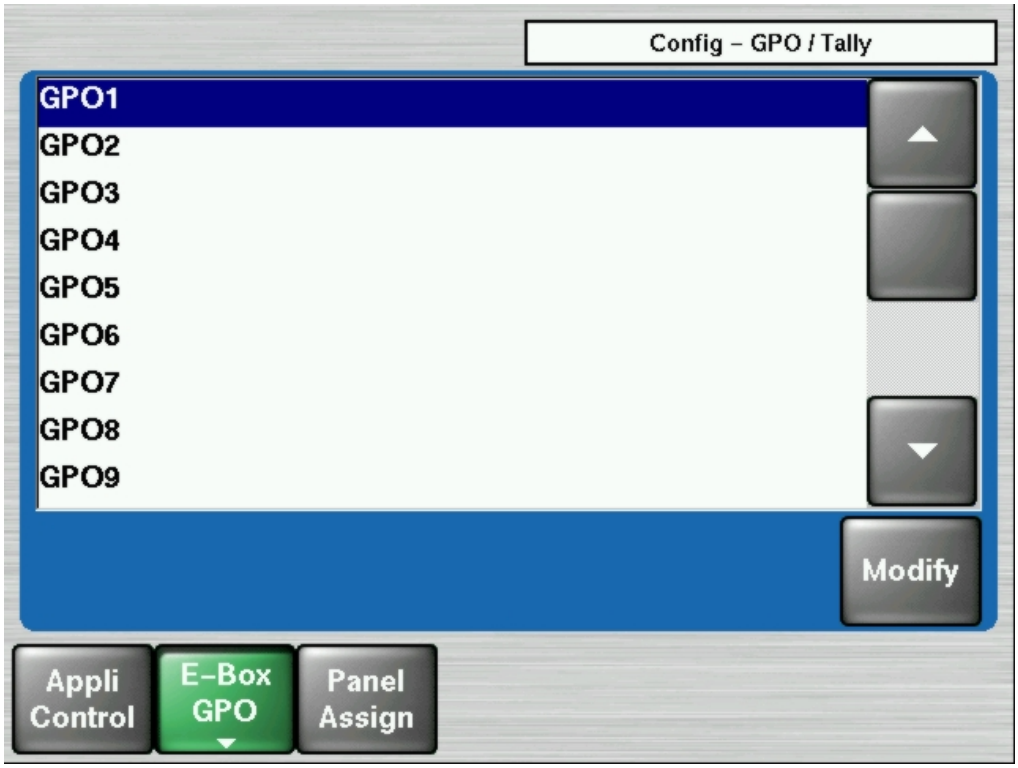


Figure 99 Config - GPO Menu

Touching the **Modify** button calls a sub-menu. In this menu the tally mode of the selected GPO channel 1 – 32 can be configured.

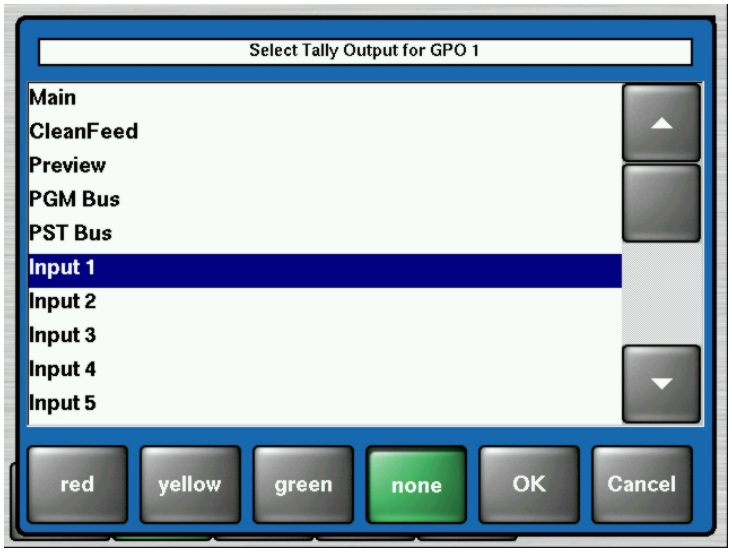


Figure 100 Config - GPO / Tally Mode Selection

5.3.2.3 Config - Key Couple Menu

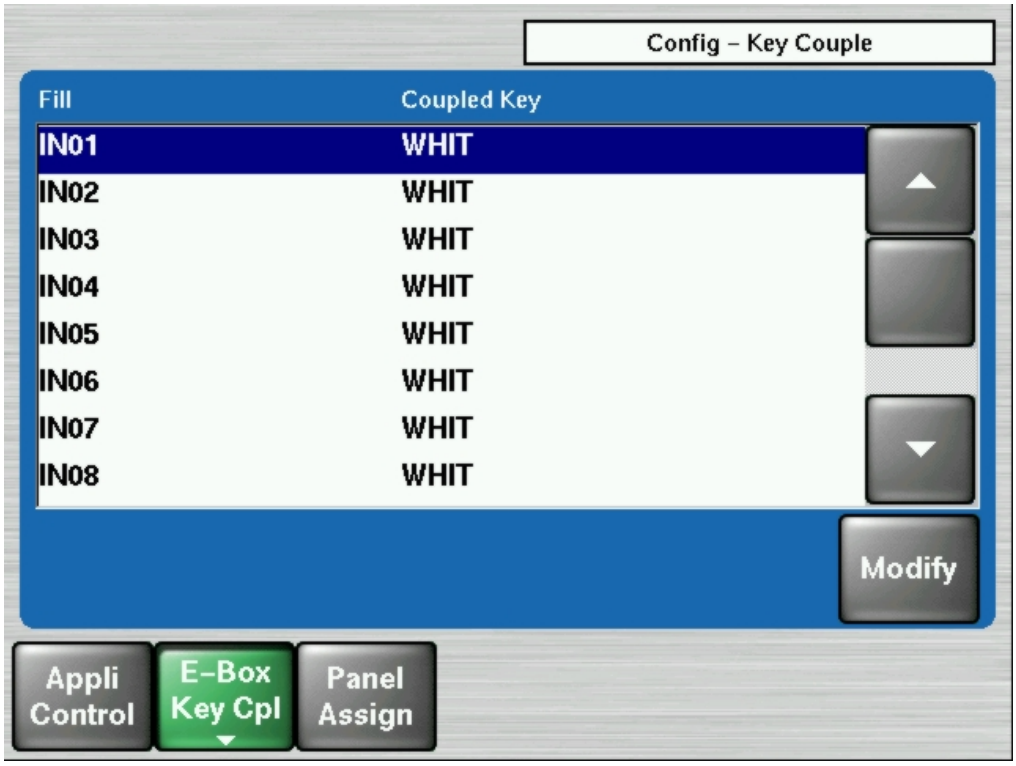


Figure 101 Config - Key Couple Menu

Touching the **Modify** button calls a sub-menu. In this menu the coupled key to the selected fill source can be configured.

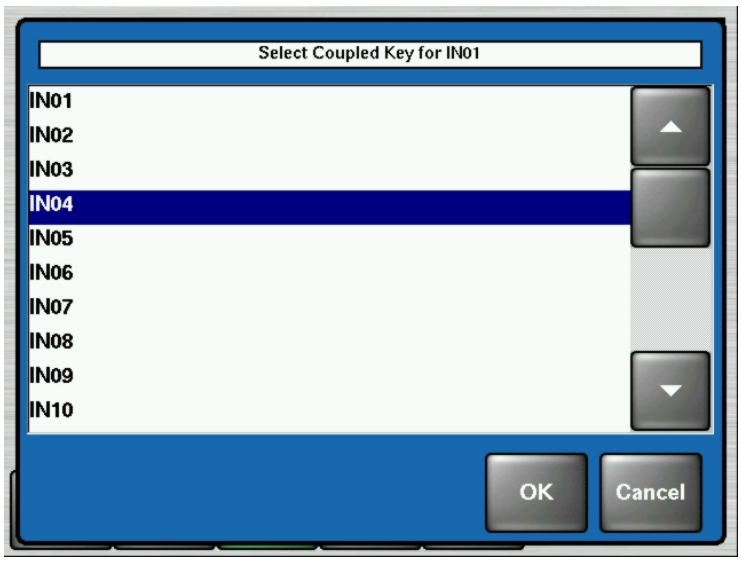


Figure 102 Config – Coupled Key Selection Menu

5.3.2.4 Config - Aux Menu

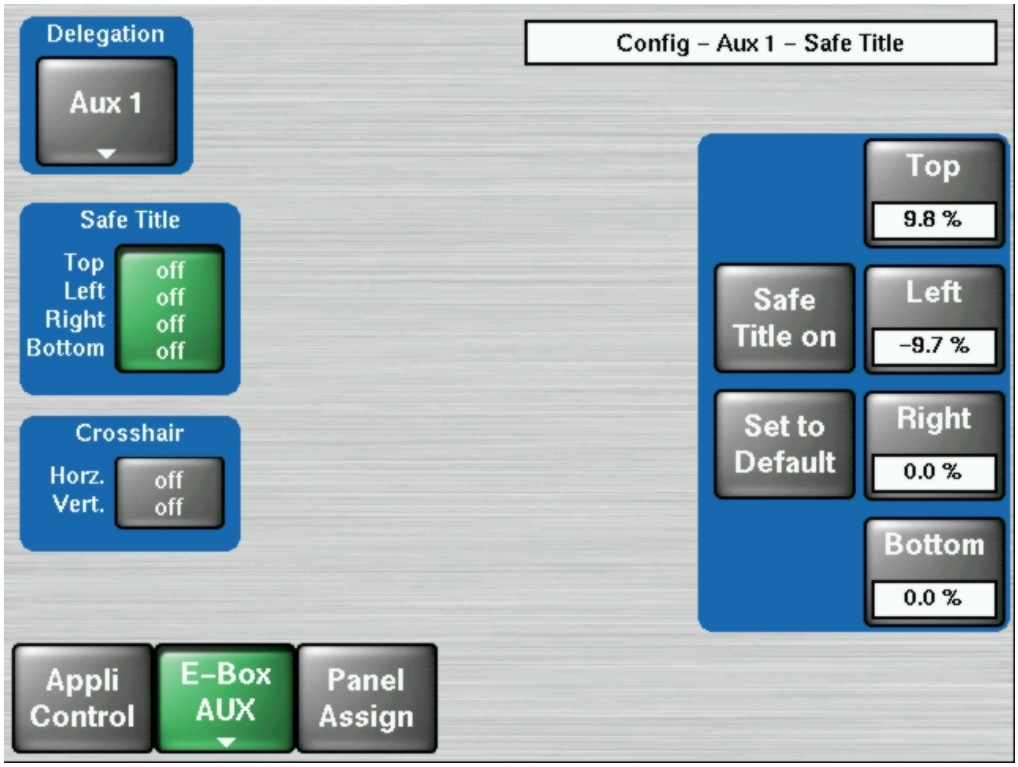


Figure 103 Config - Aux Menu

The Config - Aux menu serves to Aux bus delegation and Title configuration.

The safe Title adjusting elements enable fading–in different auxiliary lines (Box, Cross) into each individual Aux bus. The fadings serve as an auxiliary means to mark at productions defined picture areas (e.g. areas for logos, subtitles, 4:3 raster). The digipots enable to adjust the title box or the center cross over the complete picture area.

- **Safe Title** fades in a rectangular frame
- **Crosshair** fades in a center cross

5.3.2.5 Config - M/E Menu

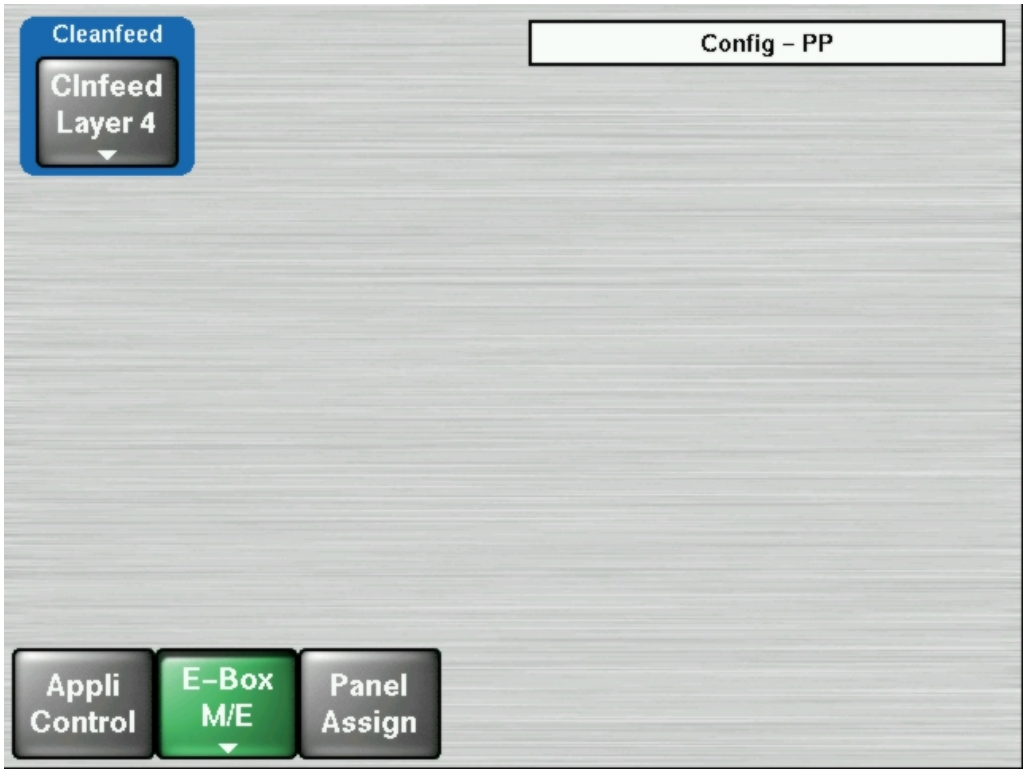


Figure 104 Config – M/E Menu

The Config – M/E menu serves to configure the cleanfeed layer.

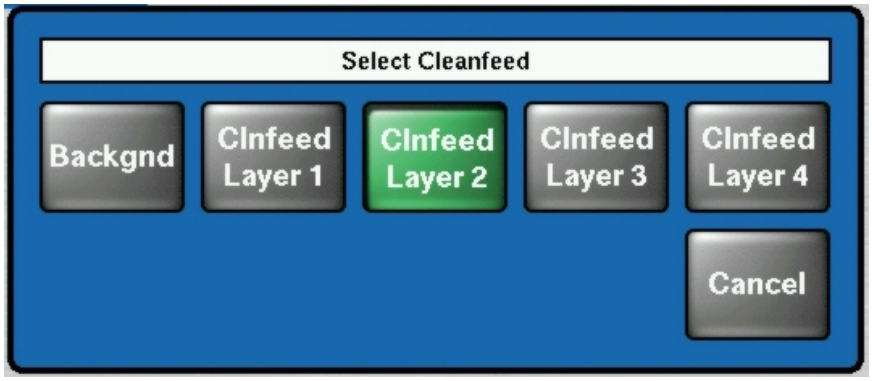


Figure 105 Config – Cleanfeed Layer

5.3.2.6 Config - DPM Menu

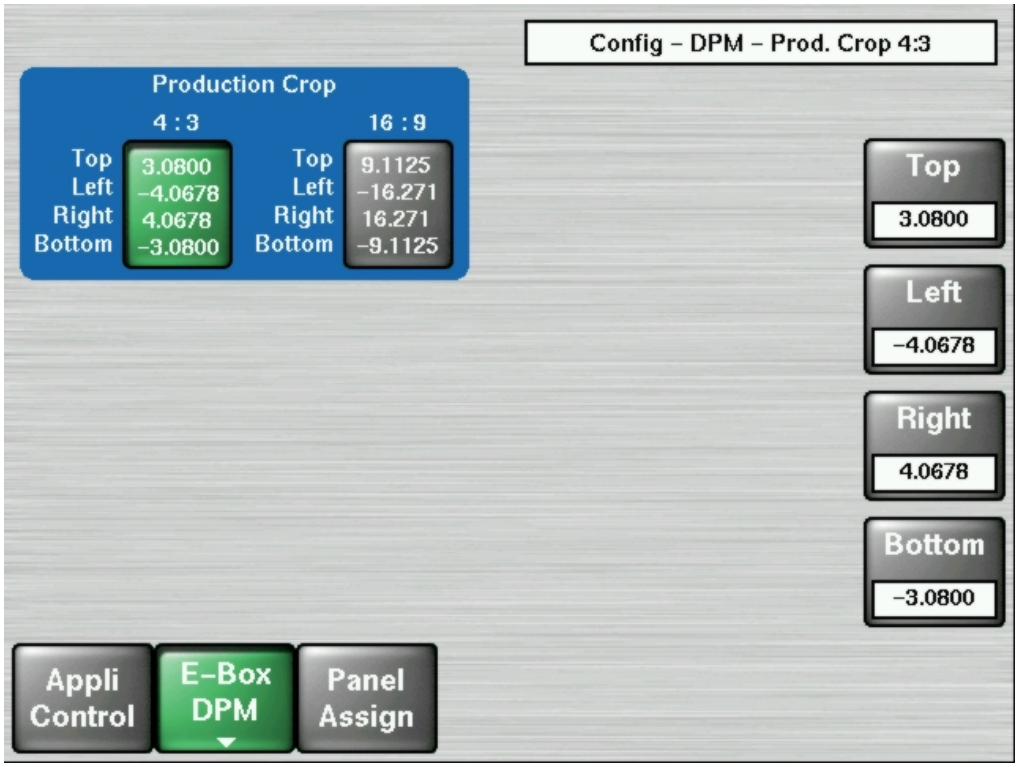


Figure 106 Config – DPM Menu

The production crop settings allow you to adjust an overall crop for the DPM channels. Additional cropping per channel is possible in the DPM/Transform/Crop menu.

5.3.2.7 Config - Misc Menu

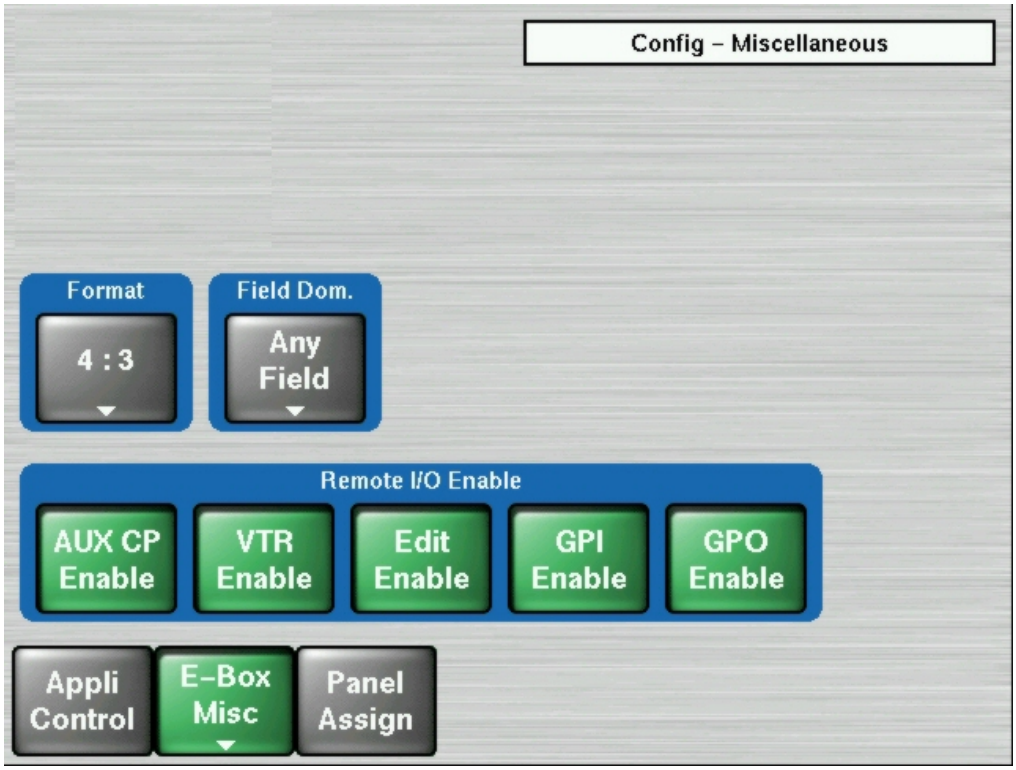


Figure 107 Config – DPM Menu

Format
Select TY size standard 4:3 or 16:9

Field Dominance
The button can be used to switch over between **Any Field**, **Field1** and **Field2.** The setting concerns the switching of the crosspoints on all busses, the start of auto transitions, switching with Cut and the recalling of snapshots and timelines. In position **Any Field** switching occurs at the beginning of the next frame. In position **Field 1/2** switching or starting occurs before the corresponding field.

Remote I/O Enable buttons
The Remote button group has to be used to enable the following functions:

- Enables Aux control panels
- Enables the VTR control
- Enables editor control
- Enables GPI inputs channels
- Enables GPO output channels

5.3.3 Config – Panel Assignment

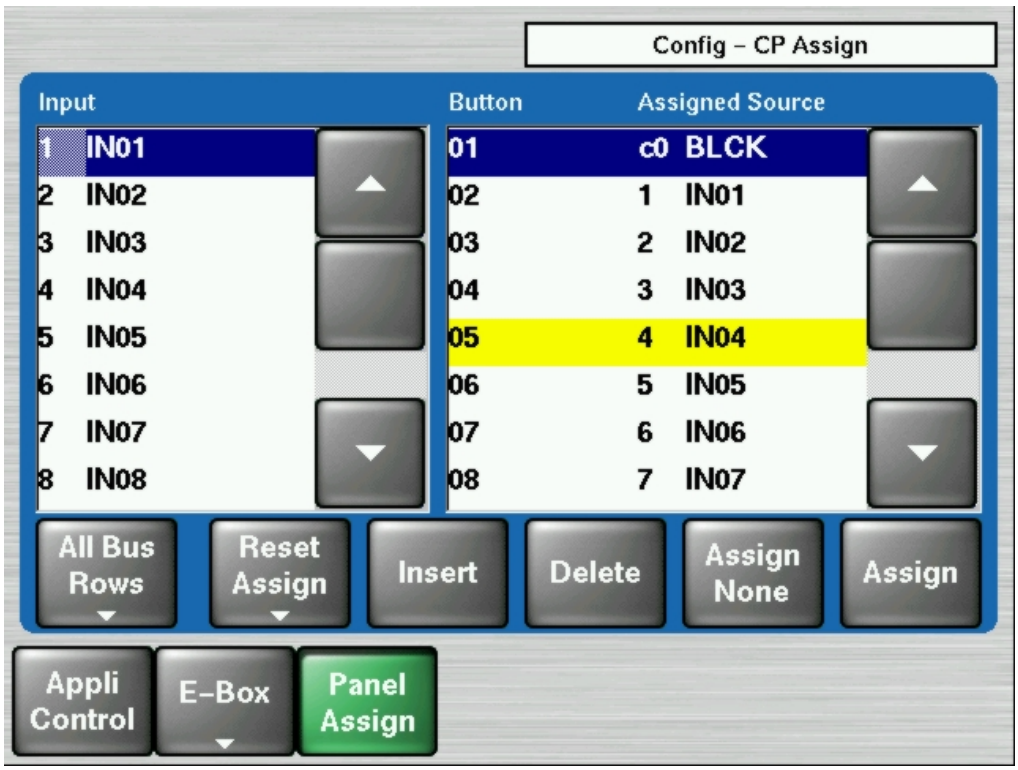


Figure 108 Config – Panel Assignment Menu

The **Panel Assign** menu serves to assign the hardware inputs and internal sources to the source buttons of the KayakDD control panel.

All Bus Rows pre-selects the panel's bus rows for which the Input Assignment should be changed.

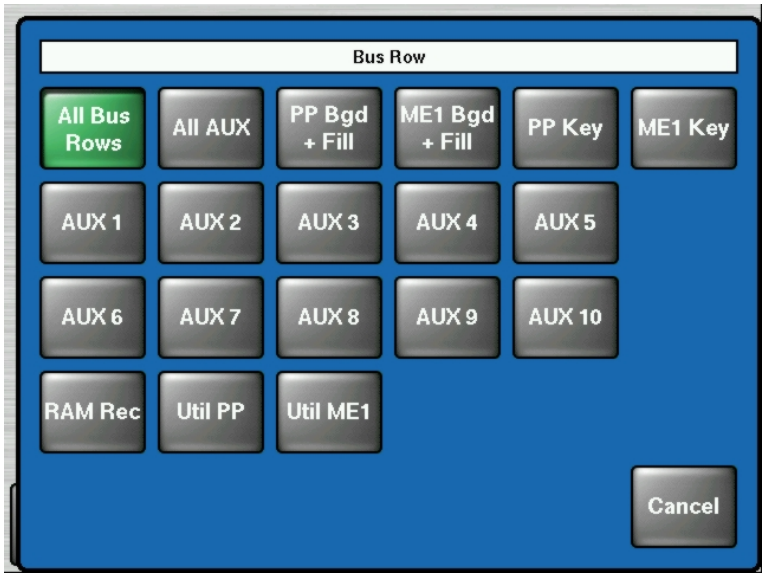


Figure 109 Config – Panel Assignment - Bus Row Selection Menu

Pressing **Reset Assignment** opens an dialog with some pre-defined input assignments:

Figure 110 Config – Panel Assignment – Reset

- **Like Bgnd** copies the input assignment from the Bgnd bus row into the key bus row (only for key buses)
- **Like AUX All** copies the input assignment from the AUX All bus row into the selected bus row.
- **Like All** copies the input assignment from the ALL bus row into the selected bus row.
- **Black Left** makes a default assignment with input Black on the leftmost button.
- **Black Right** makes a default assignment with input **Black** on the rightmost button.
- **All None a**ssigns no input to all buttons of selected bus row.
- **Cancel** closes the dialog window.

5.4 Personal Settings Menus

The menu permits personality settings for the panel.

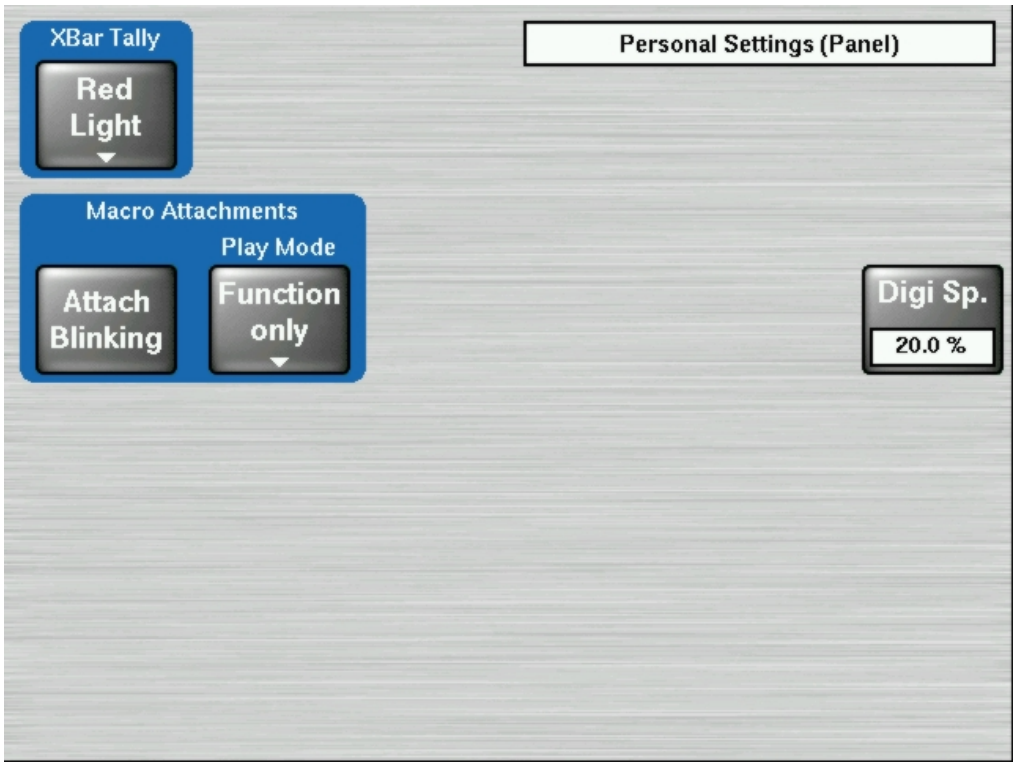


Figure 111 Personal Settings Menu

Digi Sp. Digipot Speed
Sensitivity of the digipots can be adjusted to personal needs.

Touching the **XBar Tally** button calls a sub-menu. In this menu the tally mode of crossbar buttons can be configured.

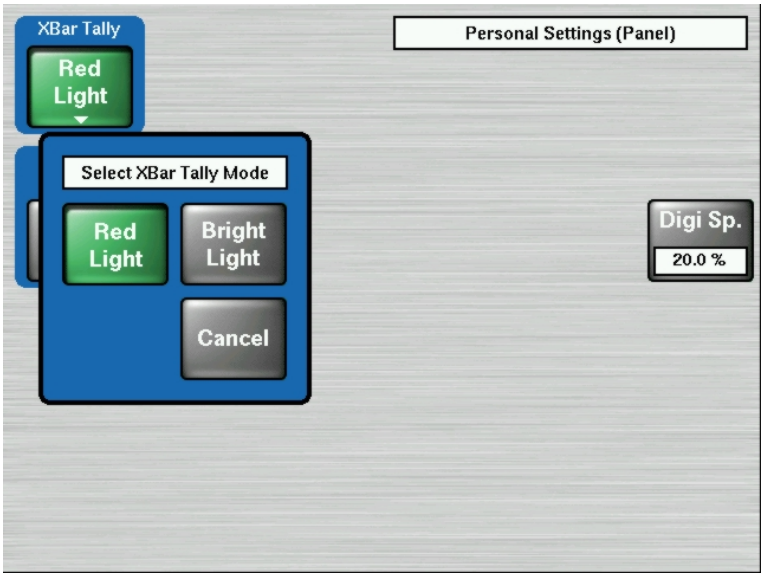


Figure 112 Personal Settings – XBar Tally Mode

Touching the **Macro Attachment Play Mode** button calls a sub-menu. In this menu the Play mode of the selected macro can be configured.

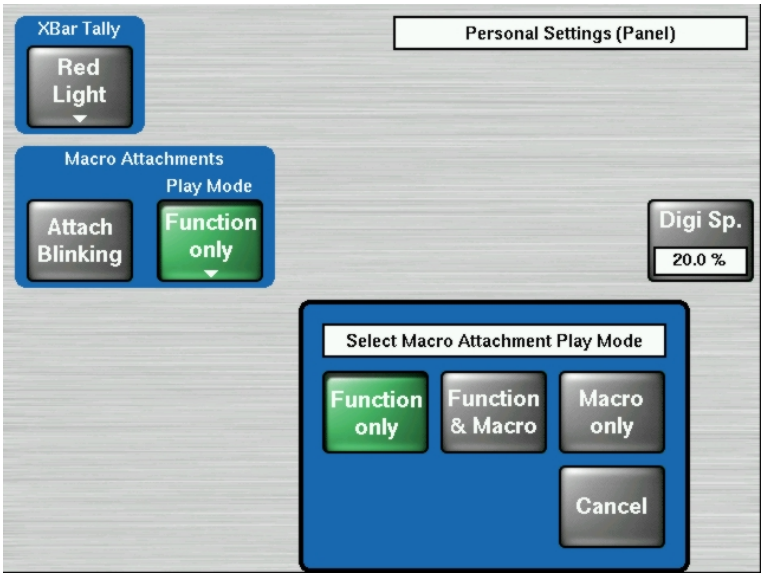


Figure 113 Personal Settings – Macro Attachment Play Mode

Touching the **Macro Attachment Play Mode** button calls a sub-menu. In this menu the Play mode of the selected macro can be configured.

5.5 Wipes Menus

The Wipe menus allow selection and modification of wipe patterns. The Wipe menus, like the Keyer menus, have a delegation popup button In the upper left area, the button right to it contains a pattern touch pad, which displays the currently selected shape.

The **Wipe** button in the Transition subpanel is a DPOP button (double-pressing it brings up the M/E menu).

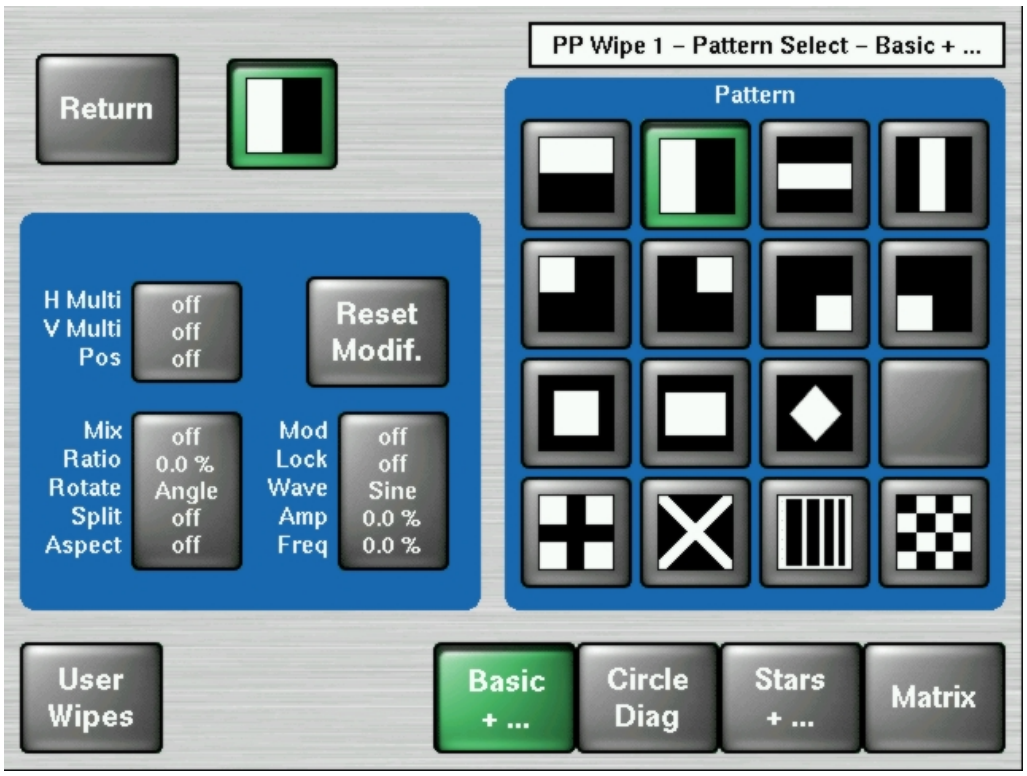


Figure 114 Wipe Menu – Pattern Selection

In the wipe pattern selection panel, 16 wipe patterns may be directly selected. Further wipe patterns can be recalled by pressing one of the wipe group selection buttons **Basic**, **Circle Diag**, **Stars** or **Matrix** a new selection appears. The selected wipe pattern is shown right of the delegation button.

In addition to providing standard patterns, the KayakDD production switcher offers the possibility to prepare and store user-defined wipe patterns.

5.5.1 Point of Use

Only the controls which affect the pattern generator itself are adjusted in the wipe menu. Other parameters like size, border, direction, which are different per point of use are set in the according ME or Keyer menus.

For operating simplicity, you may decide to use the Complex wipe generators (Wipe1 and Wipe2) for main transitions, and the simpler Box and Keyer wipe pattern generators for the keyers. However, the KayakDD system gives you the flexibility to use complex wipe generators
with either main transitions or for keying and masking, and also the ability to use Utility bus video as the wipe pattern shape.

Wipe resources and points of use are diagramed in *Figure 115* below.

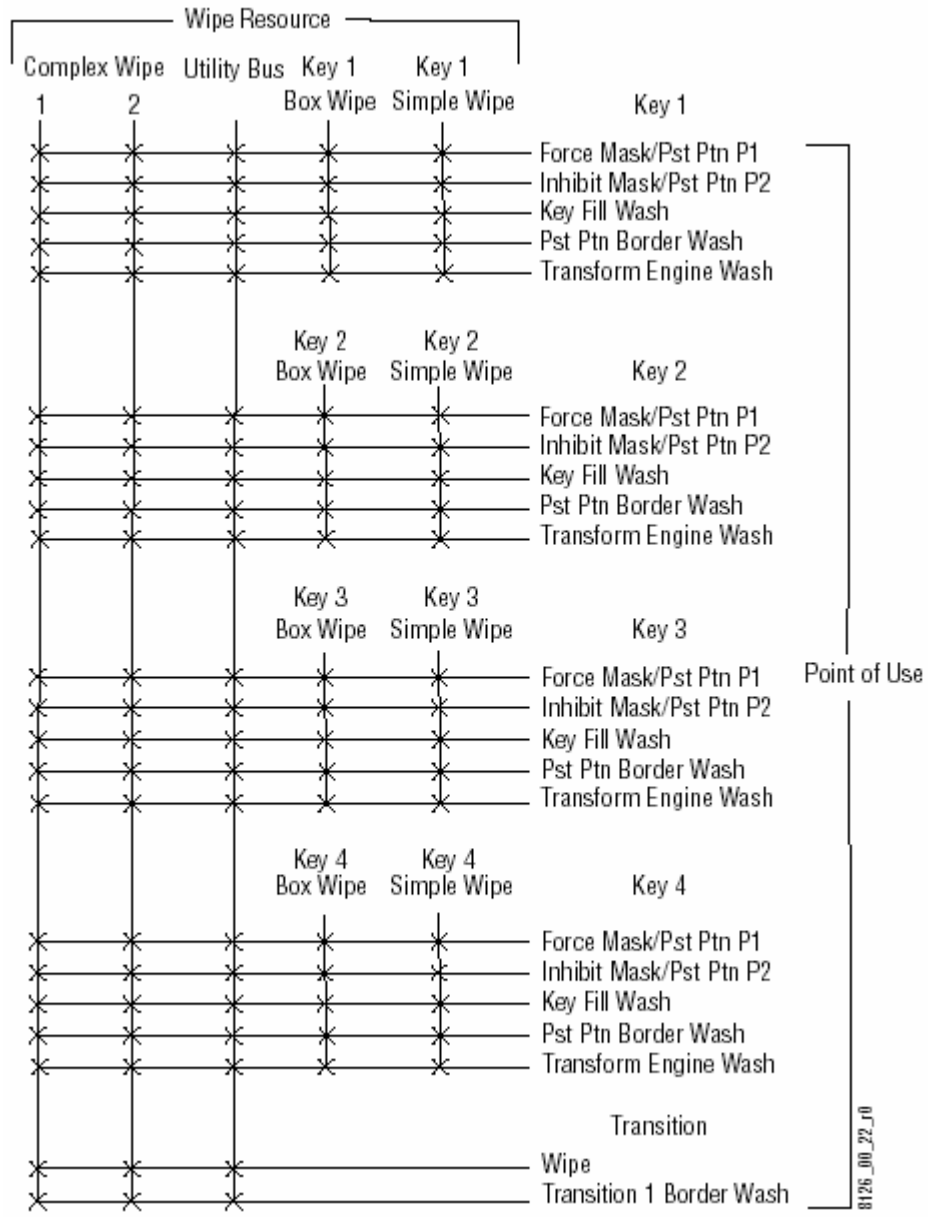


Figure 115 Typical Wipe Switching Matrix and Point of Use

5.5.2 Pattern Selection Menu

Touching the **Pattern** touch pad brings up the palette of wipe shapes available (Figure below). Selecting a pattern will change the shape of the pattern in the **Pattern** touch pad to indicate the new pattern. The available patterns are grouped in 4 submenus:

- **Basic +…**
  Combinations of horizontal, vertical, and diagonal edges
- **Circles / Diag**
  Enclosed shapes, expanding from the picture's center, combinations of horizontal, vertical, and diagonal edges and combinations of horizontal and vertical edges rotating about various center points (clock wipes)
- **Stars +…**
  Enclosed stars and shapes, expanding from the picture's center, and zigzag moving various directions
- **Matrix**
  Wipes consisting of sequential revelation of picture squares (matrix wipes)

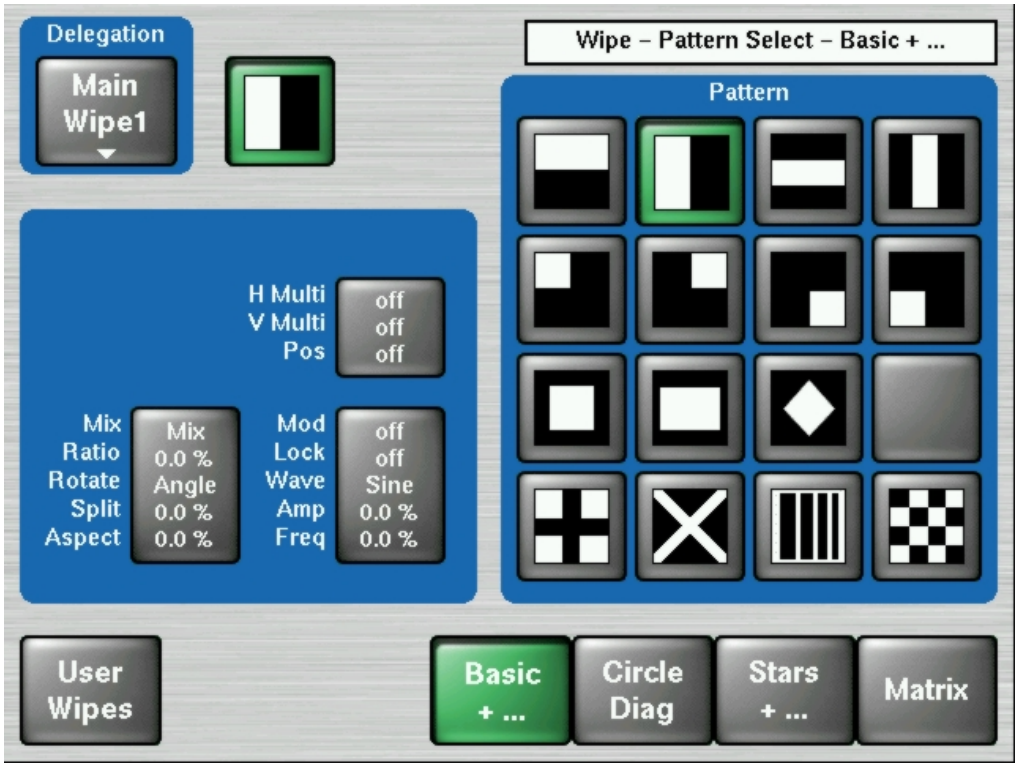
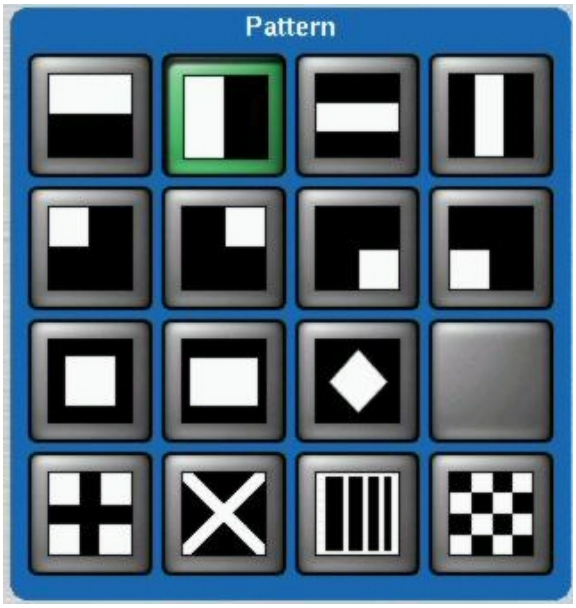


Figure 116 Pattern Selection Menu

5.5.3 Wipe Pattern Number Code

The available wipe patterns and their assigned codes are included in the figures below. Codes are named according to ANSI/SMPTE 258M. Code names in **[xx]** are GVG pattern numbers!

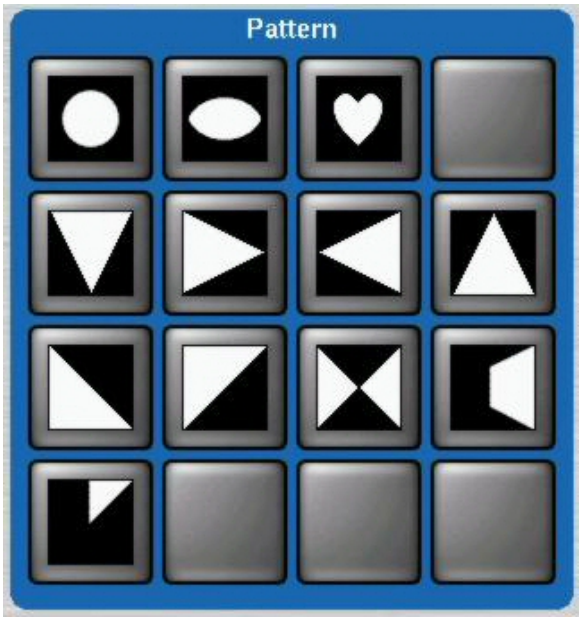
5.5.3.1 Page 1 – Basic Pattern



Respective Code Number:

002 [10]	001 [0]	022 [30]	021 [20]
003	004	005	006
009	101	020	
007	047 [17]	501 [46]	502 [58]

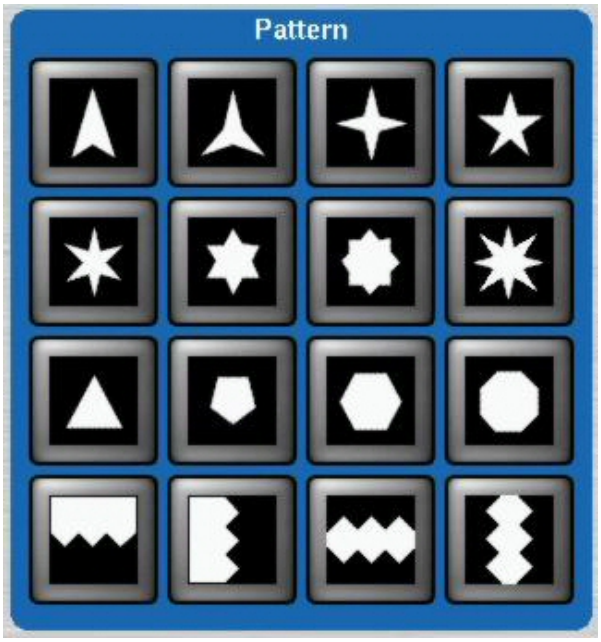
5.5.3.2 Page 2 – Circle and Rotary



Respective Code Number:

119	122	130 [28]	
061	064	062	063
042	041	044	261 [16]
191 [6]			

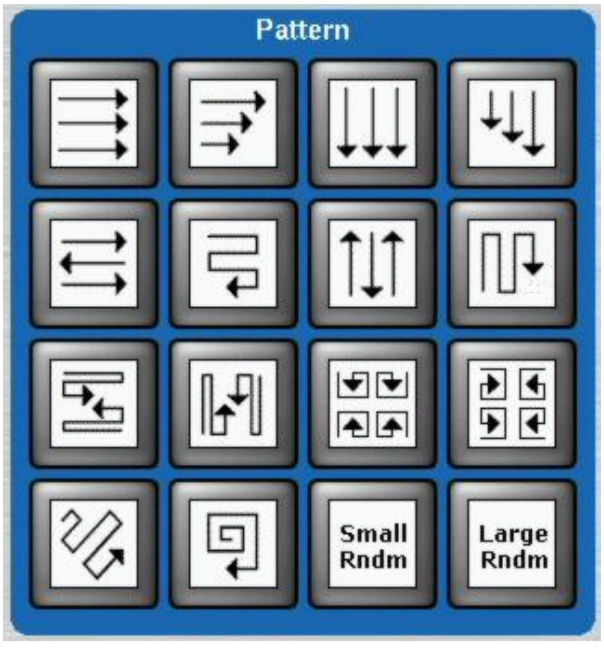
Page 3 – Stars and ZigZag



Respective Code Number:

107	513 [40]	127 [41]	128 [27]
504 [42]	129 [43]	505 [44]	132 [59]
103 [5]	112 [15]	113 [8]	506 [18]
072 [25]	071 [26]	507 [36]	508 [35]

5.5.3.3 Page 4 – Matrix Wipes (in preparation)



Respective Code Number:

509 [52	086 [29	510 [51]	080 [48]
511 [49]	301 [19]	512 [50]	302 [47]
326 [56]	323 [57]	344 [53]	345 [55]
303 [54]	087 [9]	513 [38]	085 [39]

5.5.4 Wipe Modifier

Using the modifiers like **H/V Multi**, **Mix/Ratio/…** or **Mod/Lock/…** the standard wipe patterns can be changed and new patterns can be created.

In dependence of the chosen Modifier the menu changed. The soft knobs on the left of the screen are used to control the various parameters. The knobs that appear will differ depending on the type of pattern modifiers chosen.

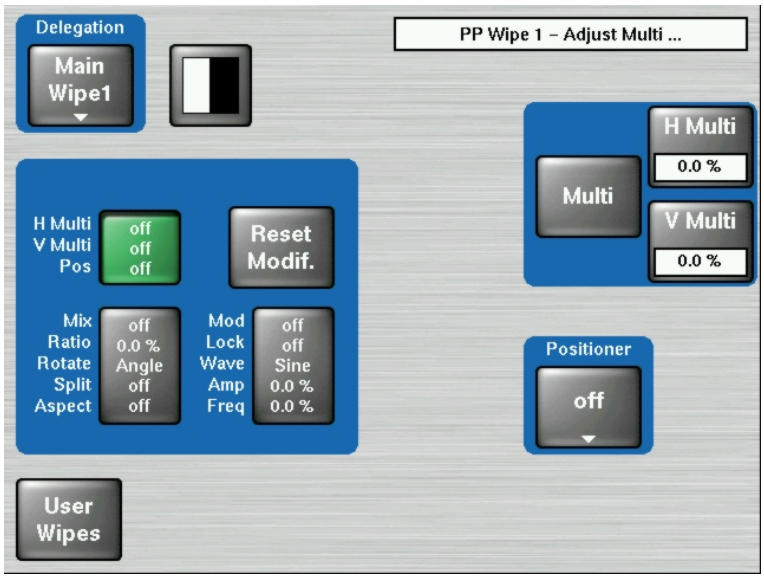


Figure 117 Wipe Menu – Modifier 1

Pos, Rotate, Repeat, Split, Aspect – Allows control of the pattern positioner and the repeat (H and V Multiply) functions. Modifier parameters are controlled with the soft knobs on the right of the screen.

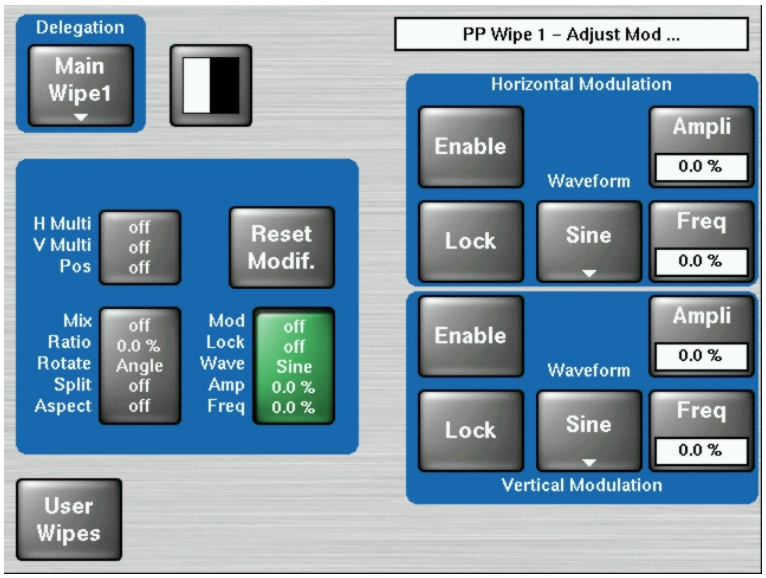


Figure 118 Wipe Menu – Modifier 3

Mix, Ratio, … – Allows control of the pattern mix function. Patterns may be mixed or non-add mixed with the Mix Type control data pad. The ratio may be chosen by touching the **Ratio** data pad to bring up the numeric keypad. The modifier rotation, split and aspect functions are controlled with the soft knobs on the right of the screen.

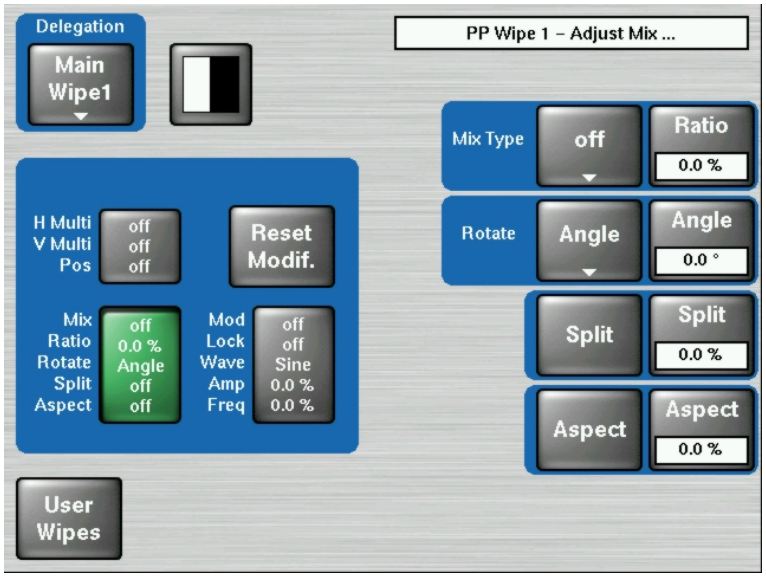


Figure 119 Wipe Menu – Modifier 3

Mod, Lock, Wave, … - Allows enabling and control of the modulation wipe functions. Patterns may be modulated vertically or horizontally with four different waveforms (Square, Sine, Sawtooth and Triangle). Soft knobs on the right of the screen control amplitude and frequency of the H and V modulation.